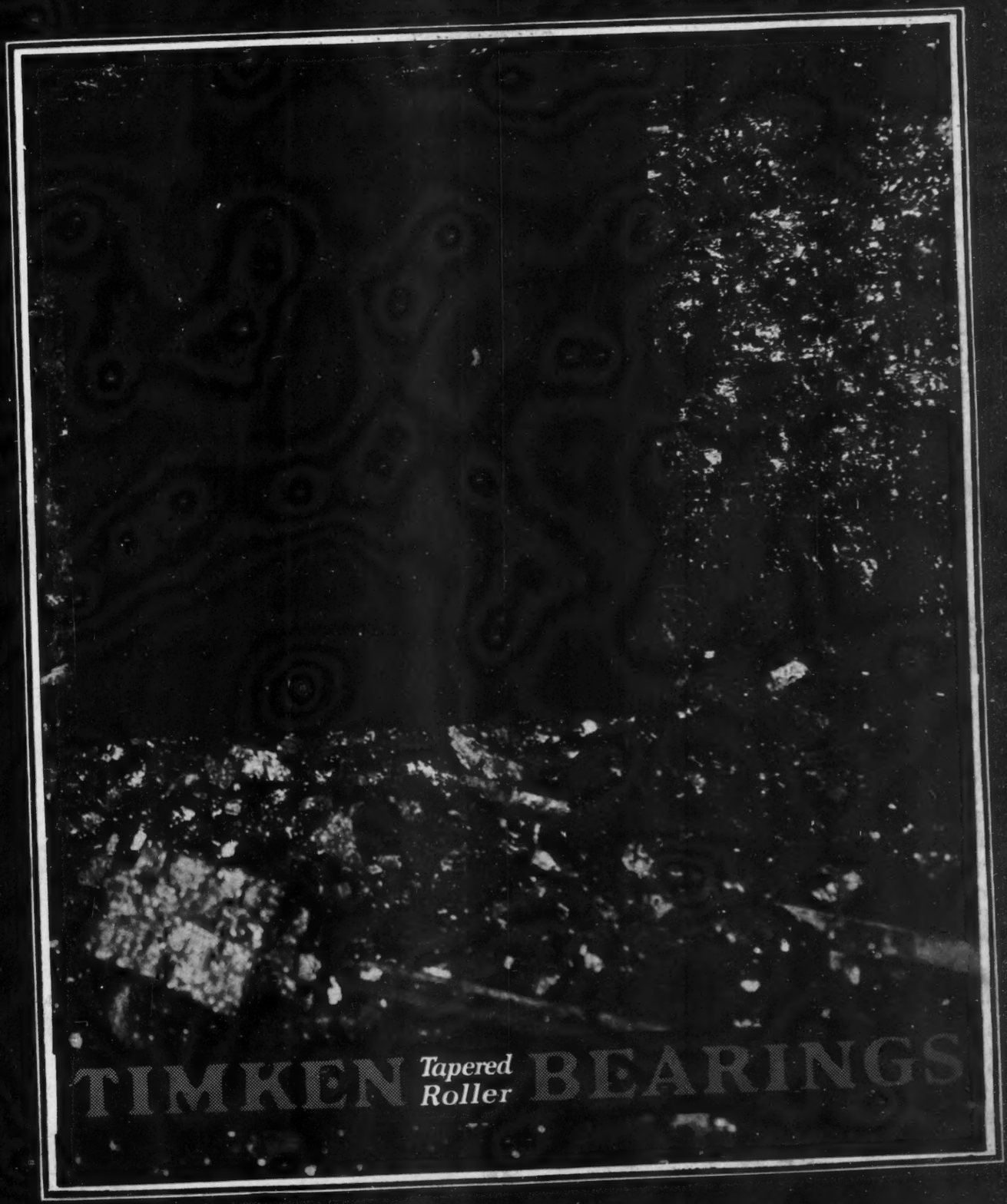
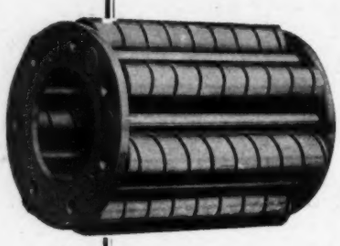

TIMKEN Tapered Roller BEARINGS

"I have succeeded"

said the purchasing official, with evident exultation, "in getting our next lot of mine cars cheaper than those we bought last spring. I got prices from several manufacturers. I will have to watch to see that all specifications are lived up to. They certainly figured low."



The General Manager of Mines picked up the order form and fingered it thoughtfully.

"As a purchasing Agent you have done exactly right," he said "But now look at this business a moment as I have to look at it—as a manager concerned with production and the cost per ton.

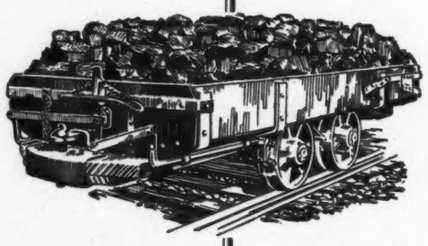
"Take this plant, for instance, the tipple equipped with labor-saving devices, the best mining machines we could find, modern locomotives and an expensive group of efficient mine executives who know how to produce coal 'backwards' at a good cost. We could have built and equipped a cheaper plant and I could get much lower priced men.

"Now our mine cars are but a part of the fabric of the whole plant—yet they are the bottle-neck of our production, for transportation from the face to the tipple and the cost of same frequently spells the difference between a poor return or a satisfactory return upon an investment."

"What do you suggest?"

"I suggest that you pick from the group of manufacturers you got in touch with first, three or four whom you know are capable of building good cars—they are the only ones we can afford to buy—and get proposals and interview their representatives, and we will get together with the operating heads and decide who will get the business. Your inquiries specify Hyatt bearings don't they? They are our standard."

"Yes sir, I am sure your superintendents wouldn't consider any other kind."



HYATT ROLLER BEARING COMPANY
NEWARK HUNTINGTON PITTSBURGH CHICAGO
PHILADELPHIA DETROIT SAN FRANCISCO
WORCESTER CLEVELAND CHARLOTTE

HYATT
ROLLER BEARINGS

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Volume 28 — New York, December 31, 1925 — *Number* 27

E. W. DAVIDSON
Managing Editor.
FRANK H. KNEELAND
E. J. GEALY
J. H. EDWARDS
Associate Editors

COAL AGE

A. F. BROSKY, Pittsburgh
LOUIS C. MCCARTHY
Assistant Editors
PAUL WOOTON
Washington Correspondent

With which is consolidated "The Colliery Engineer" and "Mines and Minerals"
R. DAWSON HALL, *Engineering Editor*

Jigging Conveyors Used on Longwalls Make Output Sure 915
BY J. H. EDWARDS.

Labor History of Appalachian Coal Region Records Unionism's Utter Failure 920
BY SYDNEY A. HALE.

Center Shearing Increases Percentage of Lump 924
BY N. D. LEVIN.

Minto Mining Region Is Both Primitive and Modern 926
BY JOHN MCNEILL.

Union Pacific Coal Co.'s Code of Standards—III 928

Anthracite Operators and Miners Talk Peace in New York 930

Consumers' Stocks of Bituminous Coal Total 48,000,000 Tons, Nov. 1 934

Reign of Terror Marks Christmas Observance in West Virginia Strike Zone 932
Plan Co-operative Selling in Western Kentucky 932
Changes in Mines Committees in Both Houses 932
Senator La Follette Seeks Hard-Coal Data 932
Massachusetts Dealers Have Coal for About a Month 932
To Push Legislation on Hard Coal in Congress Even if Strike Ends Soon 933
Consumers Company Floats Big Bond Issue 933
Pittsburgh Coal Co. Soon to Reopen Sixth Mine in Smoky City District 933
1,000 Gondolas for L. & N. 933

Editorials 913
Practical Pointers 936
Weekly Review and the Market 938
Foreign Market and Export News 943
News Items from Field and Trade 944
Traffic 946
New Equipment 947

McGRAW-HILL COMPANY, INC.
Tenth Avenue at 36th Street, NEW YORK, N. Y.

WASHINGTON, Colorado Building
CHICAGO, 7 South Dearborn Street
PHILADELPHIA, Real Estate Trust Building
CLEVELAND, Leader-News Building
ST. LOUIS, Star Building
SAN FRANCISCO, 883 Mission Street
LONDON, 6 Bouverie Street, E. C. 4, London

Cable Address: "Machinist, N. Y."
The annual subscription rate is $3 in the United States, Canada, Mexico, Alaska, Hawaii, the Philippines, Porto Rico, Canal Zone, Cuba, Honduras, Nicaragua, Dominican Republic, Salvador, Peru, Colombia, Bolivia, Ecuador, Argentina, Chile, Spain, Panama, Brazil, Uruguay, Costa Rica, Guatemala and Paraguay. Extra foreign postage $3 (total $6 or 25 shillings). Single copies, 20 cents.
Change of Address—When change of address is ordered the *new* and the *old* address must be given. Notice must be received at least ten days before the change takes place.

JAMES H. MCGRAW, President
ARTHUR J. BALDWIN, Vice-President
MALCOLM MUIR, Vice-President
EDWARD J. MEHREN, Vice-President
MASON BRITTON, Vice-President
JAMES H. MCGRAW, Jr., V.-P. and Treas.
C. H. THOMPSON, Secretary

Publishers of
Coal Age — Engineering and Mining Journal-Press
Engineering News-Record — American Machinist
Power — Chemical and Metallurgical Engineering
Ingeniería Internacional — Radio Retailing
Bus Transportation — Electric Railway Journal
Electrical World — Electrical Merchandising
Journal of Electricity
(Published in San Francisco)
Industrial Engineer
(Published in Chicago)
American Machinist—European Edition
(Published in London)

Copyright, 1925
By McGraw-Hill Company, Inc.
Published weekly
Entered as second-class matter Oct. 14, 1911, at the Post Office at New York, N. Y., under the Act of March 3 1879.
Printed in U. S. A.
Member Audit Bureau of Circulations
Member Associated Business Papers, Inc.

Number of copies printed this issue, 11,656

Saving Anthracite

"ELECTRIFY!" IS THE INJUNCTION many an engineer has given anthracite producers who wonder how to cut down the tonnage of their own coal consumed at the mines. The Glen Alden Coal Co. is obeying the injunction. The story of how it reduced its power house consumption to a scant 7.8 per cent of its total production in 1924 is told in next week's issue of *Coal Age* by C. R. Seem, the company's electrical engineer.

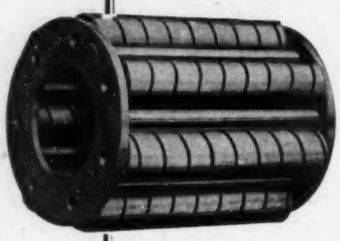
The Glen Alden properties are highly electrified because the records prove that it pays to run mines on that basis. The quantity of steam used to generate electrical energy for motors is, in most instances, less than one-third that necessary to drive steam-operated equipment. On an average, 76 lb. of coal were required under the boilers for every horsepower-hour of work done at the shaft of a steam engine and but 29 lb. to generate electricity for the same unit of power. This sort of thing does its own convincing.

FAILURE OF CONCRETE SHAFT LININGS is another subject treated interestingly in the forthcoming issue. Newell G. Alford, of Pittsburgh, has concluded, after an exhaustive study of such linings in Pennsylvania, that most of the 30 failures out of 105 cases he covered were due to poor drainage behind the shaft walls. Even the best of concrete aided by design and workmanship above reproach cannot withstand the presence of much water behind the lining. Many a mining man will realize this after he reads Mr. Alford's article next week.

Advertising Index—Alphabetical, 36; Classified, 33; Consulting Engineers, 28; Searchlight Section, 29 and 30

"I have succeeded"

said the purchasing official, with evident exultation, "in getting our next lot of mine cars cheaper than those we bought last spring. I got prices from several manufacturers. I will have to watch to see that all specifications are lived up to. They certainly figured low."



The General Manager of Mines picked up the order form and fingered it thoughtfully.

"As a purchasing Agent you have done exactly right," he said "But now look at this business a moment as I have to look at it—as a manager concerned with production and the cost per ton.

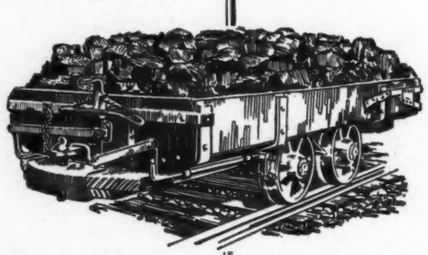
"Take this plant, for instance, the tipple equipped with labor-saving devices, the best mining machines we could find, modern locomotives and an expensive group of efficient mine executives who know how to produce coal 'backwards' at a good cost. We could have built and equipped a cheaper plant and I could get much lower priced men.

"Now our mine cars are but a part of the fabric of the whole plant—yet they are the bottle-neck of our production, for transportation from the face to the tipple and the cost of same frequently spells the difference between a poor return or a satisfactory return upon an investment."

"What do you suggest?"

"I suggest that you pick from the group of manufacturers you got in touch with first, three or four whom you know are capable of building good cars—they are the only ones we can afford to buy—and get proposals and interview their representatives, and we will get together with the operating heads and decide who will get the business. Your inquiries specify Hyatt bearings don't they? They are our standard."

"Yes sir, I am sure your superintendents wouldn't consider any other kind."



HYATT ROLLER BEARING COMPANY
NEWARK HUNTINGTON PITTSBURGH CHICAGO
PHILADELPHIA DETROIT SAN FRANCISCO
WORCESTER CLEVELAND CHARLOTTE

HYATT
ROLLER BEARINGS

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Volume 28 — New York, December 31, 1925 — *Number* 27

E. W. DAVIDSON
Managing Editor.
FRANK H. KNEELAND
E. J. GEALY
J. H. EDWARDS
Associate Editors

COAL AGE

A. F. BROSKY, Pittsburgh
LOUIS C. MCCARTHY
Assistant Editors
PAUL WOOTON
Washington Correspondent

With which is consolidated "The Colliery Engineer" and "Mines and Minerals"
R. DAWSON HALL, *Engineering Editor*

Jigging Conveyors Used on Longwalls Make Output Sure 915
BY J. H. EDWARDS.

Labor History of Appalachian Coal Region Records Unionism's Utter Failure 920
BY SYDNEY A. HALE.

Center Shearing Increases Percentage of Lump 924
BY N. D. LEVIN.

Minto Mining Region Is Both Primitive and Modern 926
BY JOHN MCNEILL.

Union Pacific Coal Co.'s Code of Standards—III 928

Anthracite Operators and Miners Talk Peace in New York 930

Consumers' Stocks of Bituminous Coal Total 48,000,000 Tons, Nov. 1 934

Reign of Terror Marks Christmas Observance in West Virginia Strike Zone 932
Plan Co-operative Selling in Western Kentucky 932
Changes in Mines Committees in Both Houses 932
Senator La Follette Seeks Hard-Coal Data 932
Massachusetts Dealers Have Coal for About a Month 932
To Push Legislation on Hard Coal in Congress Even if Strike Ends Soon 933
Consumers Company Floats Big Bond Issue 933
Pittsburgh Coal Co. Soon to Reopen Sixth Mine in Smoky City District 933
1,000 Gondolas for L. & N. 933

Editorials 913
Practical Pointers 936
Weekly Review and the Market 938
Foreign Market and Export News 943
News Items from Field and Trade 944
Traffic 946
New Equipment 947

McGRAW-HILL COMPANY, INC.
Tenth Avenue at 36th Street, NEW YORK, N. Y.

WASHINGTON, Colorado Building
CHICAGO, 7 South Dearborn Street
PHILADELPHIA, Real Estate Trust Building
CLEVELAND, Leader-News Building
ST. LOUIS, Star Building
SAN FRANCISCO, 883 Mission Street
LONDON, 6 Bouverie Street, E. C. 4, London

Cable Address: "Machinist, N. Y."
The annual subscription rate is $3 in the United States, Canada, Mexico, Alaska, Hawaii, the Philippines, Porto Rico, Canal Zone, Cuba, Honduras, Nicaragua, Dominican Republic, Salvador, Peru, Colombia, Bolivia, Ecuador, Argentina, Chile, Spain, Panama, Brazil, Uruguay, Costa Rica, Guatemala and Paraguay. Extra foreign postage $3 (total $6 or 25 shillings). Single copies, 20 cents.
Change of Address—When change of address is ordered the *new* and the *old* address must be given. Notice must be received at least ten days before the change takes place.

JAMES H. MCGRAW, President
ARTHUR J. BALDWIN, Vice-President
MALCOLM MUIR, Vice-President
EDWARD J. MEHREN, Vice-President
MASON BRITTON, Vice-President
JAMES H. MCGRAW, JR., V.-P. and Treas.
C. H. THOMPSON, Secretary

Publishers of
Coal Age — Engineering and Mining Journal-Press
Engineering News-Record — American Machinist
Power — Chemical and Metallurgical Engineering
Ingeniería Internacional — Radio Retailing
Bus Transportation — Electric Railway Journal
Electrical World — Electrical Merchandising
Journal of Electricity
(Published in San Francisco)
Industrial Engineer
(Published in Chicago)
American Machinist—European Edition
(Published in London)

Copyright, 1925
By McGraw-Hill Company, Inc.
Published weekly
Entered as second-class matter Oct. 14, 1911, at the Post Office at New York, N. Y., under the Act of March 3 1879.
Printed in U. S. A.
Member Audit Bureau of Circulations
Member Associated Business Papers, Inc.

Number of copies printed this issue, 11,656

Saving Anthracite

"ELECTRIFY!" IS THE INJUNCTION many an engineer has given anthracite producers who wonder how to cut down the tonnage of their own coal consumed at the mines. The Glen Alden Coal Co. is obeying the injunction. The story of how it reduced its power house consumption to a scant 7.8 per cent of its total production in 1924 is told in next week's issue of *Coal Age* by C. R. Seem, the company's electrical engineer.

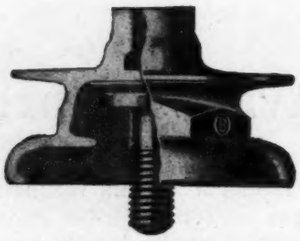
The Glen Alden properties are highly electrified because the records prove that it pays to run mines on that basis. The quantity of steam used to generate electrical energy for motors is, in most instances, less than one-third that necessary to drive steam-operated equipment. On an average, 76 lb. of coal were required under the boilers for every horsepower-hour of work done at the shaft of a steam engine and but 29 lb. to generate electricity for the same unit of power. This sort of thing does its own convincing.

FAILURE OF CONCRETE SHAFT LININGS is another subject treated interestingly in the forthcoming issue. Newell G. Alford, of Pittsburgh, has concluded, after an exhaustive study of such linings in Pennsylvania, that most of the 30 failures out of 105 cases he covered were due to poor drainage behind the shaft walls. Even the best of concrete aided by design and workmanship above reproach cannot withstand the presence of much water behind the lining. Many a mining man will realize this after he reads Mr. Alford's article next week.

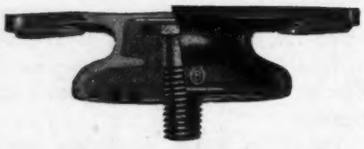
Advertising Index—Alphabetical, 36; Classified, 33; Consulting Engineers, 28; Searchlight Section, 29 and 30

ROOF — TIMBER — PIPE — I-BEAM

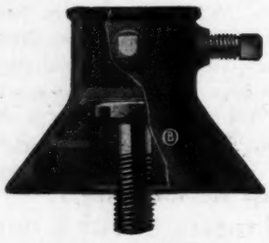
Insulated Hangers



Type K—for roof



Type H—for timber. With clamp, for I-beam



Type U—for pipe

There is quite a variety in the different types of O-B insulated Hangers. But that is not evidence that O-B has tried to see how many different designs could be originated.

It is evidence of a wide experience in mine electric haulage. The many types have been developed from actual contact with a variety of mine trolley requirements.

And back of this is an active engineering organization willing and anxious to apply information gathered from work at many properties to those problems peculiar to your property.

The Ohio Brass Company
Mansfield, Ohio
In Canada–Dominion Insulator & Mfg. Co., Limited–Niagara Falls, Ont.

O-B TROLLEY MATERIAL

COAL AGE

McGRAW-HILL COMPANY, INC.
JAMES H. McGRAW, *President*
E. J. MEHREN, *Vice-President*

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

R. DAWSON HALL
Engineering Editor

Volume 28 | NEW YORK, DECEMBER 31, 1925 | Number 27

Peace or War?

AFTER NEARLY FIVE MONTHS of long-distance sharpshooting, anthracite operators and union spokesmen for the miners again face one another across the conference table. The issues to be decided are the same as when John L. Lewis, president of the United Mine Workers, abruptly terminated the joint conferences at Atlantic City on Aug. 4. Neither side has publicly receded from its interpretation of the factual questions involved in the union's demands. Both sides still challenge their opponents' interpretation of those facts.

In the weary weeks of alternating hope and despair which have intervened, however, there has been time for reflection, time to test the temper of the contestants. There has been time, too, to study the drift of public opinion and to weigh the strategy so far pursued in the cold light of actual results achieved. The idle miners already have lost in wages more than three times the annual increases written into their demands. The spirit of holiday adventure in which they laid down their tools has vanished. An empty Christmas, depleted savings and increasing actual want—that is the price they have paid for following leaders who elected to wage war where honorable peace was offered.

No more successful leader than John L. Lewis ever has guided the destinies of the United Mine Workers. He has wrung victory from situations in which less bold captains would have acknowledged defeat. But his strategy in the anthracite strike has everywhere met with disaster. His attempts to scare the public into a belief that the householder would freeze to death if the anthracite mines were closed left the public apathetic—or hostile. His attempts to stampede the federal government into intervention with the threat of a general bituminous strike resulted only in government action opening up eastern states to the non-union coals of West Virginia. The public, to be sure, has been inconvenienced, but it is his own followers in the anthracite region who have been the real victims of Mr. Lewis' campaign.

If he so wills, Mr. Lewis can perhaps continue the struggle much longer. It is in his power to inflict further heavy financial losses upon the operators. But in the exercise of that power, he must bleed white the workers who have placed loyalty to the union organization above cost and above sacrifice. Conceivably such a course might be justified if the alternative were abject surrender. No such alternative, however, confronts the union. The peace proposals of the operators are not, as some people would like to believe, one-sided. In offering arbitration in place of a war of exhaustion, operators risk as much as the miners. They risk a decision which might award the union the check-off against which the operators have railed as bitterly as have the union leaders against arbitration. They risk, too, the possibility of a decision which would increase wages.

Obviously, if miners and operators cannot agree among themselves as to the facts involved and their bearing upon the demands made, the sensible thing to do is to submit the case to a third party for decision. This is the rule of enlightened civilization. Of course, it means arbitration; and arbitration, once a constitutional aim of the United Mine Workers, is anathema to the union leaders. Mr. Lewis has had his fling at war. He will show real leadership if he now inclines to honorable peace.

Our Rail Problem

SOME OF OUR many operators—the successful ones—are taking a serious view of the transportation problems of the mine, and subjecting mine-haulage questions to the light gained from a study of railroad operation. What railroad company delivers cars without thought of whether they can be used, or lets the engineer feel his way along the road without signals or direction, or permits the making up of trains without regard to definite standards determined for the haulage equipment supplied? And what coal mine with a large tonnage can afford to neglect the precautions that every railroad takes?

In a metal-mine, perhaps, where there is discipline and men invariably come to work unless sickness supervenes or prior notice has been given—where also, as the men are not dependent on each other but do their work without a division of labor into cutting, scraping, shooting and loading, and are never ruled out of their places because of the presence of methane, it might be possible to route mine cars to any given section of a mine without ascertaining how many men are out and how many cars are necessary; but in coal mining that is not so. Especially is this true in the evening, when the motormen run around unexpectantly looking for enough cars to justify their having started on another trip. Thus they waste time when they should be laid off, because all the men whose behests they serve have gone home long before.

With a dispatching system the dispatcher knows where cars are needed and when. The trips are switched where they are wanted, often before word arrives at the office that the men in 10th left are at a picnic, a christening or a sheriff's sale, or that the cutters in that heading had a burnout and failed to cut several places in the preceding night, or again that the fireboss marked for danger several of the rooms in that heading.

With such a system motormen do not stop and waste time trying to ascertain if the road is clear. The dispatcher has a definite knowledge of just where the trips are, and moves the cars in accord with that information. He is able to tell just where the coal is coming from and accordingly can detail to the foreman where he would do well to proceed to correct any lag in tonnage. As a rule all cars look alike to the weighman. Without a tedious analysis, an examination of the weigh sheet gives no information as to the section

that is failing to measure up to the tonnage requirements. A dispatcher's record of cars supplies that defect and gives to the foreman a quantitative story of the status of each section.

With mines producing up to about 13,000 tons daily, with hauls up to five miles, and with small cars rarely exceeding five tons capacity per car, the mines have a big railroad problem. It will be solved according to approved transportation standards, and not in the haphazard manner that marked the era of the mule skinner.

An Outside Summary and Viewpoint

IN A QUESTION so complex as that of the industrial factors underlying the coal industry, even those who are closest do not agree as to the ills and the remedies. Those who are entirely outside the industry, but to whom the coal question is one of interest, as touching their private affairs at many points, are less well informed and less able to judge; nevertheless, they do the best they can, and of such public opinion, the most potent, perhaps, of modern influence is formed. As an example of such trends of opinion is an article by Arthur E. Suffern in the December issue of *Atlantic Monthly*, an article which endeavors to be guarded and balanced, and to abstain so far as possible from judgment, after having stated the history of coal troubles and the opposing contentions. We quote from this article without comment or approval: The article states in a preliminary that "the failure of nineteen coal companies and a union representing over 160,000 anthracite miners to come to an agreement upon wages, hours, and working conditions faces millions of people with the prospect of a shortage of fuel, inadequate heating facilities, and high prices." And the writer adds, "In every controversy there are two sides to be heard. Both sides have a story to tell and a cause to defend. The people who want an uninterrupted supply of coal should not be an interested public. One-sided condemnations of either the miners or the operators will not control the conditions that cause strikes." After stating at length the case on both sides the writer observes:

"However, the placing of mere abstract rights in opposition will not solve the problem of equity in wages, profits, and prices to the consumer. Nor will it curb the abuse of power that may be practised by the miners, the operators, or the public. The more the strike is prolonged, the less likely is the prospect that an equitable adjustment will be made, because pressing conditions will probably bring a forced settlement." And in the summary of the case, the author first ventures a personal opinion:

"Whether a settlement is made in joint conference or by a commission, comprehensive data on costs, prices, and profits is a prime need for the coal industry. Otherwise there is no basis of arriving at equity between the miners, the operators, and the consumers. Such data need to be collected from year to year by the Government under conditions that will make the data dependable. They can then be used with authority by the miners and operators in joint conference in arriving at voluntary agreements or by commissions in arbitration proceedings. If the operators and miners desire to settle their affairs without the aid of the Government, they stand in the best position to do so when all the cards are on the table.

"To deal with the present crisis and to establish more constructive industrial relations for the future requires a new order of statesmanship. If the leaders on both sides have the statesmanship to introduce a co-operation between the management and the union, similar to that which is in operation on certain railroads with the railroad shop-crafts, the first requisite for that end will be reliable data from year to year on actual conditions in the coal industry."

In Praise of Partisanship

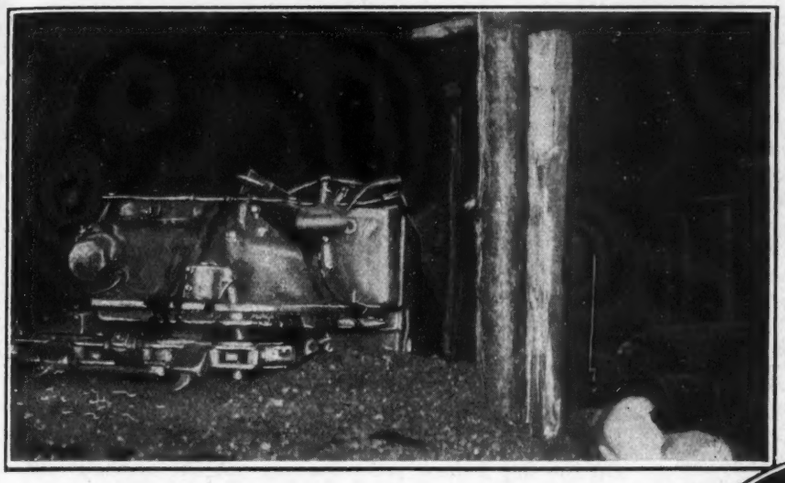
THERE ARE TIMES when nothing is so conducive to justice as a lusty partisanship. The process of balancing one contention against another can be drawn out to such a fine point that labored impartiality becomes more harmful than helpful. In a meticulous desire to omit the presentation of no fact which will support one side or the other in an economic controversy there is always the danger that the public may become so confused by the minutiæ that broad fundamentals are obscured. "A plague o' both your houses" then becomes the public's substitute for a discriminating judgment.

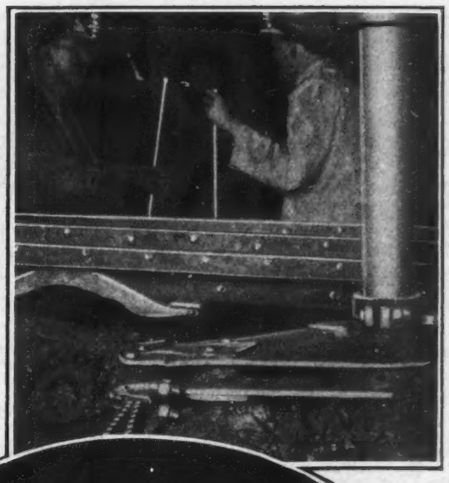
This is the danger that dogs the present anthracite situation. A President rightly condemns "the perennial conflict" in the coal industry, but neglects placing the blame for the existing suspension. A close student of labor relations in the coal fields makes a succinct summary of the hopes and aspirations of employers and employees in the hard coal region and then calls for more "facts" as a basis of settlement. A group of eminent economists and engineers warns the industry that there can be no abiding peace until a joint agency attacks the technical problems of management. All of these unprejudiced critics shrink from asking the public to take sides.

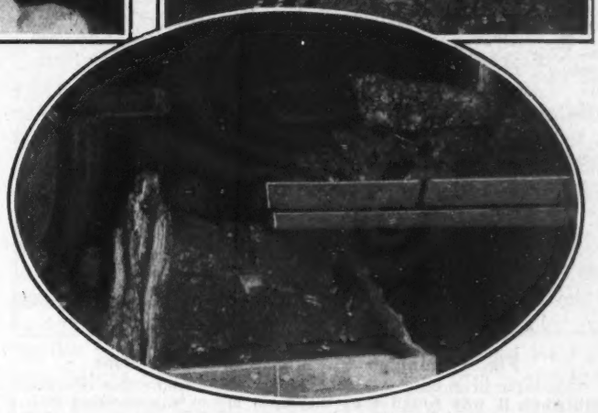
Were there a necessity for the public to pass judgment on the conflicting statistical claims of the contestants, this scrupulous regard for impartiality would be understandable. But no such task is imposed upon the public. The issue is much simpler. All the public is asked to do in its own behalf and for its own protection is to single out the contestant that blocks the approach to a peaceful solution. That question determined, it becomes an easy matter for the public to register its disapproval of such an attitude. This decision cannot be reached, however, through any indiscriminate damnation of the industry as a whole. Operators and miners must be considered separately, and the blame assessed where it belongs.

If that discrimination is exercised, there will be no difficulty in making the assessment. From the start of the negotiations the operators have offered unrestricted arbitration of all issues upon which they cannot agree with their employees. Their position is unchanged. From the start the union leaders of the miners have rejected that offer. Insisting upon the justice of their demands for higher wages and changes in working conditions, they have repeatedly refused to submit their cause to arbitration. The public, of course, can draw its own conclusions.

"A strike in modern industry," said Calvin Coolidge recently, "has many of the aspects of war in the modern world." Those who love industrial peace, whose comfort and whose pocket-books are hit by industrial war, however, do not help the cause of peace when they condemn both the aggressor and the aggrieved with equal vehemence or even when they withhold judgment. We need not alone lip service to the principle of arbitration, but a courageous decision in favor of industrial disputants who stand for that principle.







Jigging Conveyors Used On Long Walls Make Output Sure

Alabama Mine Works Five Faces for Two Years with Shaker Chutes—Gob Helps Control Roof Subsidence

By J. H. Edwards
Associate Editor, *Coal Age*
Huntington, W. Va.

ALL KINDS OF MINES and mining systems may be found in Alabama—strip pits, drifts, slopes, shafts; in thick beds and in thin beds, at all inclinations from horizontal to steeply pitching; room-and-pillar, long face and longwall, running the entire gamut of mining conditions. But if one were to describe to the average operating man the various interesting mines of this state and then ask him which of them he would rather see with his own eyes, the chances are strong that he would reply: "That Aldrich mine of the Montevallo Coal Mining Co. where they are working five 325-ft. longwalls by means of shaking conveyors."

The fact that so few American mines operate on a true longwall system and that few if any employ face conveyors equaling in length those used at Aldrich, makes this operation stand out as being unique among those of the country at large. And yet, neither the longwall system nor the use of face conveyors are new at Aldrich. The mine was switched from the room-and-pillar system to longwall in 1906 by P. B. Thomas, father of D. A. Thomas who is now president and manager of the company and who, so to speak, has ironed out the kinks and wrinkles and has put the mine on a paying basis. Practically 100 per cent recovery, 67 per cent being lump, and a cost substantially below that of the room-and-pillar method makes it obvious that the "big three" have been cornered at Aldrich.

This mine, about the most southern in Alabama, is located on the edge of the Cahaba field, 45 miles by rail from Birmingham. The coal is that of the Montevallo bed, which, generally speaking, lies on a pitch of 12 to 15 deg. A typical section is shown beside Fig. 2. The working height is roughly 50 in. in which is included from 14 to 18 in. of rash. The coal is a high-grade bituminous used chiefly for domestic purposes.

Worked Through Slope for 21 Years

Opened in 1885, the mine was worked through a slope on the room-and-pillar system until 1906. Levels were turned off the slope every 200 to 300 ft. and rooms were driven up the pitch. After the slope had been advanced approximately 2,500 ft., and about the time that longwall operation was well started, it was found that the slope was running into a basin a few hundred feet wide. As Mr. Thomas expressed it, "had operations continued along the lines projected they would soon have met themselves coming back." Accordingly, a change was made and walls advanced to the rise. Since then they have been worked at various angles to the pitch.

As the scrap heap on the surface at this mine will testify, the present conveyor was not the first one tried on the longwall faces. It was preceded by a sectional chain machine of rather heavy and expensive design. The shaking chute now employed was evolved by a series of changes extending over several years made in

The illustration at the left in the headpiece accompanying this article shows a longwall machine undercutting a face. The bar of this machine is only 4 ft. long, this length having been found to be most advantageous. One such undercutter is used on each face. In the upper illustration to the right may be seen the bell-crank and side of the conveyor as well as the jack holding the the bellcrank in position. The motor-operated shaking engine is stationed some distance to the side of the conveyor, which it drives through the medium of a cable that may be seen at the bottom of the picture. The oval shows the conveyor discharging to a mine car on the heading. This passage is kept well ahead of the advancing face and bottom is lifted on it so as to afford ample room for loading the cars to full capacity.

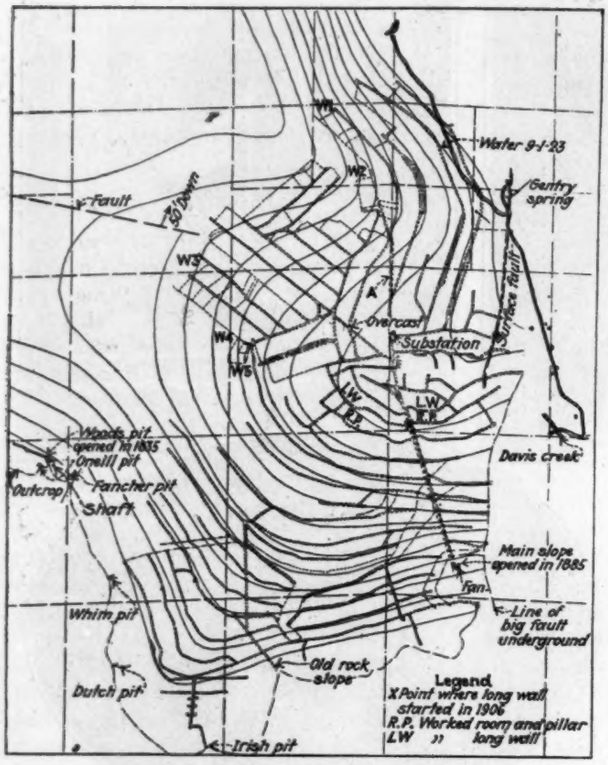


Fig. 1—Map of the Montevallo Coal Mine

This mine originally was laid out for room-and-pillar operation, but when it was found that the main slope was running into a basin of small extent the plan was changed and the longwall system adopted. Faces have since been worked at practically all angles to the pitch. The position of the present faces are indicated by W_1, W_2, etc.

the design of an original Mavor & Coulson outfit imported from Scotland.

Fig. 3 shows the four principle parts of the conveyor proper. In the foreground is a floor cradle and roller, back of which is a drive section of the trough or pan, and in the background is a common, or plain, section. This latter is one that has just been brought to the shop for repairs. A hole has been worn in the bottom and the sides are bent out of shape. The riveted splice in the center indicates that this section was, sometime before, built in the shop from two parts in fairly good condition cut from worn or damaged sections.

All sections of this conveyor are 9 ft. long. Originally ¼-in. steel plate was used in their construction, but because these soon failed a change was made to ⅜-in. plate. Two men can easily pick up and carry a section. The drive pan or segment is somewhat heavier than the others, due partly to its more sturdy construction and partly to the projection or fitting on its under side into the holes of which the connecting rod of a bell crank is fastened. The illustration at the upper right in the headpiece shows a drive section with the bell crank and its anchoring roof jack in place. In the left foreground is the wire rope which extends from the bell crank to the walking beam of the actuating motor-driven shaking engine.

Details of this engine are shown in Fig. 6 while Fig. 7 is an end-view photograph of it. The drive is by means of a 27-hp. direct-current motor. As the conveyor is moved forward after each cut the ⅞-in. drive rope is lengthened by readjusting in the connecting-rod clamp seen in the foreground. By this arrangement the engine is left in one place while the wall is advanced 50 to 100 ft., or more, as conditions may warrant.

The engine location with respect to the conveyor is indicated in Fig. 2. Here the conveyor is shown in a position about 5 ft. from the face, to which location it has been moved preparatory to loading out the cut. On the day before, when loading out the previous cut, it was in the position *A* indicated by the dotted lines.

Roof Control Presents Problem

Roof conditions in the Aldrich mine, no doubt, are favorable to longwall operation but, nevertheless, it required years of costly experience to find an adequate method of control. Overlying the coal there is from 30 in. to 15 ft. of draw slate, above that 50 to 75 ft. of sandstone, and then perhaps 100 to 125 ft. of conglomerate. The total depth of cover ranges from 435 to 800 ft.

The action of this roof is remarkable. The walls, each 325 ft. in length, are worked advancing. Cutting is done in the bottom rash with a machine having a 4-ft. cutterbar. Machines with bars of greater length up to 6 ft. were tried but it was found that a 4-ft. cut is all that consistently can be cleaned up each shift. The machine used is of the longwall type and is mounted on a sled and adjusted to the proper height to cut the parting. Six to eight sets of bits are required in cutting each wall.

Bugdust, rash, and slate from the bed are shoveled over behind the conveyor into the gob. Most places contain just about enough of this refuse to fill the gob to the roof. Where the quantity is inadequate soft cribs (not filled with rock) are built on top of it and left in place to ease the roof down in its settling process. Breaks occur every 200 to 600 ft. unless a rift in the sandstone is encountered. Such a contingency causes a great deal of trouble and much extra expense for cribbing and timbering.

The loading entry or road at the lower end of each

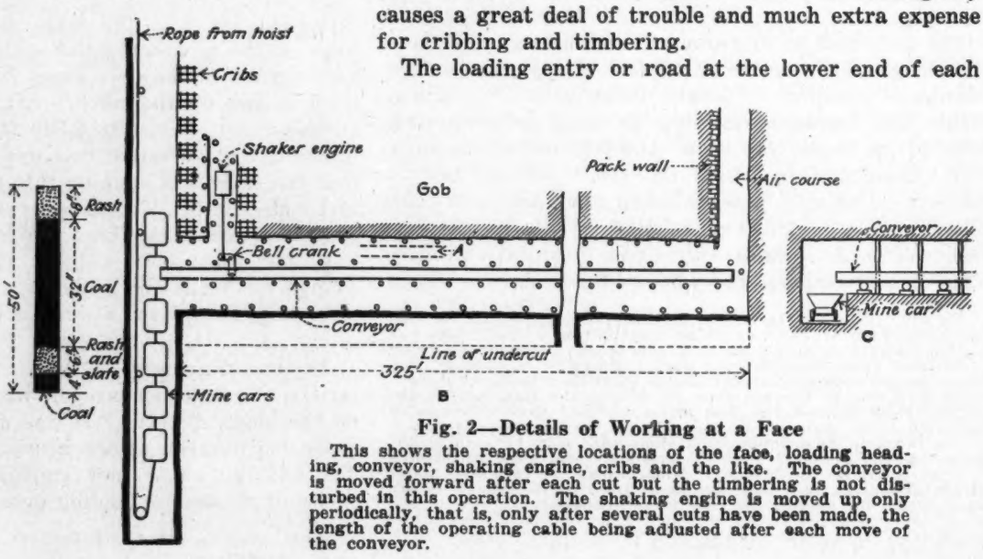


Fig. 2—Details of Working at a Face

This shows the respective locations of the face, loading heading, conveyor, shaking engine, cribs and the like. The conveyor is moved forward after each cut but the timbering is not disturbed in this operation. The shaking engine is moved up only periodically, that is, only after several cuts have been made, the length of the operating cable being adjusted after each move of the conveyor.

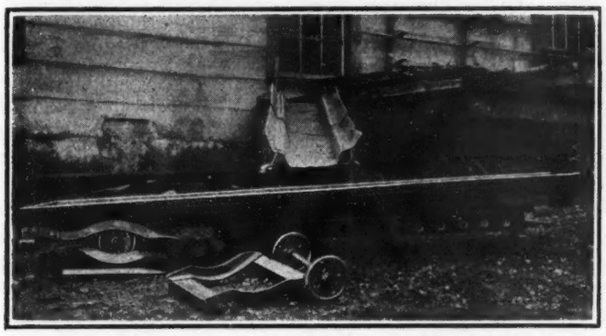


Fig. 3—Four Main Parts of the Shaking Conveyor

In the foreground may be seen the curved angle-iron track and a pair of the rollers that support the conveyor pans. Behind these is a drive section that receives reciprocating motion from the bellcrank and transmits it to the balance of the conveyor. In the background is an ordinary pan section. The particular section here shown has been sent to the shop for repair. As may be seen a hole has been worn completely through it at its upper end and it is badly bent and battered.

wall is kept about 100 ft. ahead of the face. Bottom to the extent of 4½ ft. is lifted in order to bring the tops of the cars well below the discharge end of the conveyor. Rock-packed cribs, made of 5- to 6-in. round timbers, as shown in Fig. 4, are built to protect the entry. The air course at the upper end of the wall is kept open by brushing top, the material thus brought down being used to build a pack wall that serves also as a brattice. Because the mine generates some gas, considerable care is taken to keep the ventilation at the faces up to standard. Open lights are used exclusively in this mine.

Fig. 9 shows how, at the point *A* on the map, the roof has subsided during nine years compressing the 50-in. gob to an 18-in. mass packed as hard as the coal itself. The haulageway on which this photograph was taken was driven three years ago through the gob of a longwall face that was worked six years earlier.

Much Timber Used at the Face

Timbering at the face is done with 5- to 6-in. posts set on 4-ft. centers. None of this material is recovered. Where tender roof is encountered cross timbers or straps are employed. On the wall (marked *W*, on the map) where the photographs accompanying this article were made, each new row of timbers is doubled, ahead of the conveyor, after each successive forward move. As the coal is loaded out a row of emergency or temporary props is set against the rib. These timbers are removed one at a time ahead of the mining machine and permanently reset immediately behind it, as the cut progresses. Injuries to men and loss of equipment at the face practically have been eliminated by the liberal use of timber.

Cutting along each wall progresses in one direction one night and in the opposite direction the next, the machine being left where it finishes the cut. Turning the machine around before beginning a cut is accomplished in a short time considering the limited space between timbers. The cutterbar, of course, is swung to the opposite side as the machine is turned. Five machines are used, one at each wall. Another is kept at the underground motor pit as a spare.

The sequence of operations performed by the night crew is as follows: First the daily supply of timbers is unloaded from mine cars and distributed among the 325-ft. face. As the mining machine begins the cut timber men set permanent posts behind it against the face, and double the last row previously set. At the same time a conveyor-moving gang begins work. While one man goes along removing the two ⅞x7-in. bolts that hold each section to the next, two men begin moving the 32 pans or sections, thus disconnected, to their new position.

While this is being done other men are resetting the roof jack, bell crank, and the conveyor drive section. Next the pans are bolted together, lined up and finally the floor cradles and rollers set in correct position. The alignment does not have to be perfect. One of the 325-ft. conveyors has been operated when 3 ft. out of line. Any tendency of the conveyor to buck because of bad alignment or uneven loading, is corrected by setting "rubbing" timbers to confine its movement.

How the Conveyor Works

Before describing the experiences at Aldrich in operating on various pitches, the mechanical action of the conveyor should be explained. The conveyor is nothing more than a plain sheet-metal trough or chute of a length equal to that of the wall being worked. The entire trough reciprocates with a differential motion, the stroke being 7, 8 or 9 in. long as desired, and the speed being about 65 cycles per minute.

The rope from the driving engine, through the medium of the bell crank, moves the trough quickly, on the backward stroke. Because of the shape of the cradles this movement elevates the trough and its load to a height of an inch or more. From this position it rolls back gently by gravity carrying the coal along with it. About the time that the trough reaches the lowest point of the cradle the rope jerks it backward again and the coal because of its inertia slides forward along the trough. The material conveyod thus shuffles along, a few inches at a time with a sort of wave motion.

With proper alignment and the cradles free of dirt, the conveyor will work on the level, if it is not too long, but with the conditions at Aldrich operation was not practical on ½ per cent grades, so the walls were swung to obtain an inclination of not less than 1.25 per cent in favor of the load. The conveyors have been operated satisfactorily on grades of from 1¼ to 15 deg., the average use being on about 8 deg.

This range of action affords an opportunity to swing the walls so as to advance them at an angle to the pitch. This is indicated on the map by the various directions in which the walls have been advanced, especially in

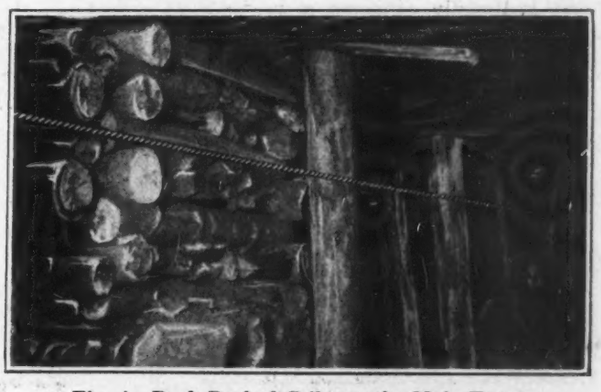


Fig. 4—Rock-Packed Cribs on the Main Entry

Naturally, the roof over the entry must be carefully supported This is done by the use of both cribs and props. In this picture may be seen the cable by means of which the cars are handled on this passage.

Fig. 5—Lump Coal in the Stockpile

B. C. Moore, master mechanic and outside superintendent, is here seen showing by comparison the size of the lumps in the stockpile. Sixty-five per cent of the coal produced in this mine is of lump size, used for domestic purposes. It can be sold practically always at a profit.

the vicinity of faults. The five 325-ft. walls which are now being worked are indicated by W_1, W_2, etc., on the map. The general conditions and methods vary but little from wall to wall. The inside photographs accompanying this article, except Fig. 9, were taken at W_2.

Experience has demonstrated that adjacent walls should be maintained either within 50 ft. of each other in order to keep the weight equalized, or should be kept over 250 ft. apart so that a fall on the leading wall will not affect the one following.

Haulage from the walls to the basin is handled by twelve single-rope hoists each driven by a 27-hp. direct-current motor. Electric locomotives assemble the trips and distribute empties in the basin at the foot of the main slope. The average weight of coal per car is 2,650 lb., and the production per wall overages about 120 tons per day.

The labor necessary for each wall is as follows: Each day-shift consists of ten loaders, one conveyor man, one timberman, one conveyor operator, two gobbers and one crib man, making a total of sixteen in all. The night shift consists of three timbermen, two conveyor movers, one machine runner, one scraper and one jack setter, making a total of eight men. Coal is shot down only as needed with 4-in. permissible powder, with no specified distance between holes. A wall does not ordinarily consume more than 25 sticks per day, including the extra number necessary for shooting tight corners.

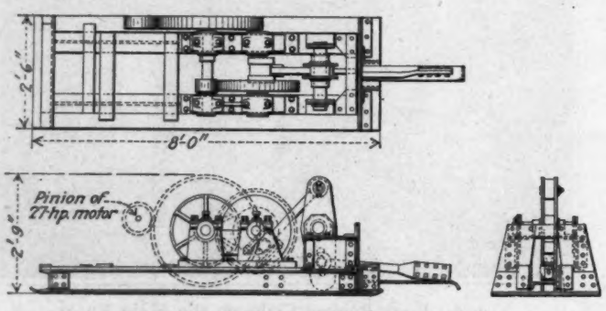


Fig. 6—Details of the Shaker Engine

Although the rotational speed of the crankshaft is uniform, the walking beam has an unequal oscillation. This, aided by the bellcrank and by gravity imparts a jigging or jerking motion to the conveyor chute.

During the last two years a remarkable record has been made at the Aldrich mine. Throughout this entire period, only five times has it proved impossible to make the regular daily advance on each of the five walls worked. These failures to load out, or to cut the face, were due either to falls on the entries or breaks on the walls. And this mine works 310 days per year! All inside labor is supplied and supervised by the state. Convicts operate locomotives, hoists, and cutting machines, as well as doing the timbering and loading at the face.

The fact that prison labor is used, of course simplifies the problem of cleaning up the walls each day. The mining company is obliged, however, to use the men every day of the year and consequently at times is compelled to stock coal at the mine. Transferring coal to the stockpile is done by placing a number of 4-ton, self-dumping boxes on railway cars, loading these at the tipple and then unloading them by means of a semi-portable, stiff-leg derrick. Coal is reloaded from the pile by filling boxes by hand and dumping in the railway cars by means of the same apparatus.

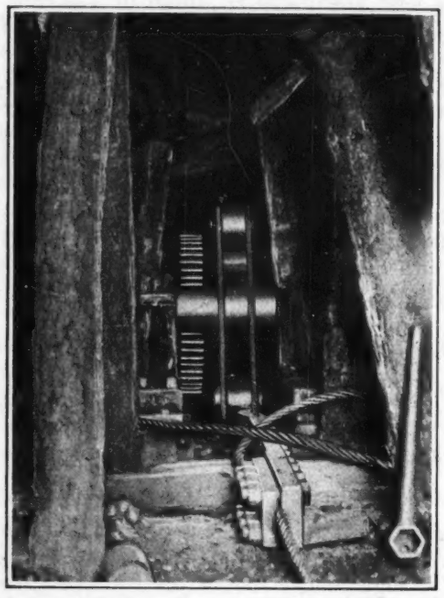


Fig. 7—End View of Shaker Engine

The adjusting clamp, by means of which the length of the cable leading to the bell crank is brought to proper length, may be seen on the end of the connecting rod in the foreground. Loosening a few bolts, lengthening or shortening the cable and tightening the bolts again effects all the adjustment that is necessary.

An interesting bit of history connected with the Aldrich mine was disclosed last year when Mr. Thomas cleaned up an old opening to the left of the present operation. This old mine is designated on the map as the Woods Pit. In it were found well-preserved relics of rather primitive mining methods. Among these were almost miniature wooden cars fitted with wooden wheels which ran on wooden rails provided with wooden frogs. Mr. Thomas states that he is fairly certain that the Woods Pit was opened in 1835. A geological report of about 1850 mentions this mine and explains that it was abandoned because of the dangerous roof. In contrast to this report, however, Mr. Thomas found the opening to have, what he would consider, a rather good roof.

The success of the last few years in operating the Aldrich mine on the longwall and face-conveyor system

Fig. 8—Looking Along the Conveyor Pan

This shows the conveyor empty or ready to receive coal. Timbering along the face is heavy and in some places it is necessary to use straps or beams from prop to prop forming virtually three-piece sets over the cenveyor. In case as sometimes happens, the conveyor shows a tendency to buckle sidewise, it becomes necessary to set "rubbing props" to hold it in line.

Fig. 9—Roof Subsidence of Three Feet

This shows J. L. Dollar, inside superintendent, demonstrating how the gob has packed to a mass as hard as the coal it displaced. At this point the roof has been subsiding for 9 yr. during which time it has settled approximately 3 ft. The haulageway where this photograph was taken was driven 3 yr. ago through a gob area that had been worked out for 6 yr.

has convinced the management that it is "on the right track." A sixth wall is now under development and considerable new equipment is being installed on the outside. Thus the steam hoist is being replaced by an 800-hp. electric machine and other equipment including the washery drives and pumps are being electrified.

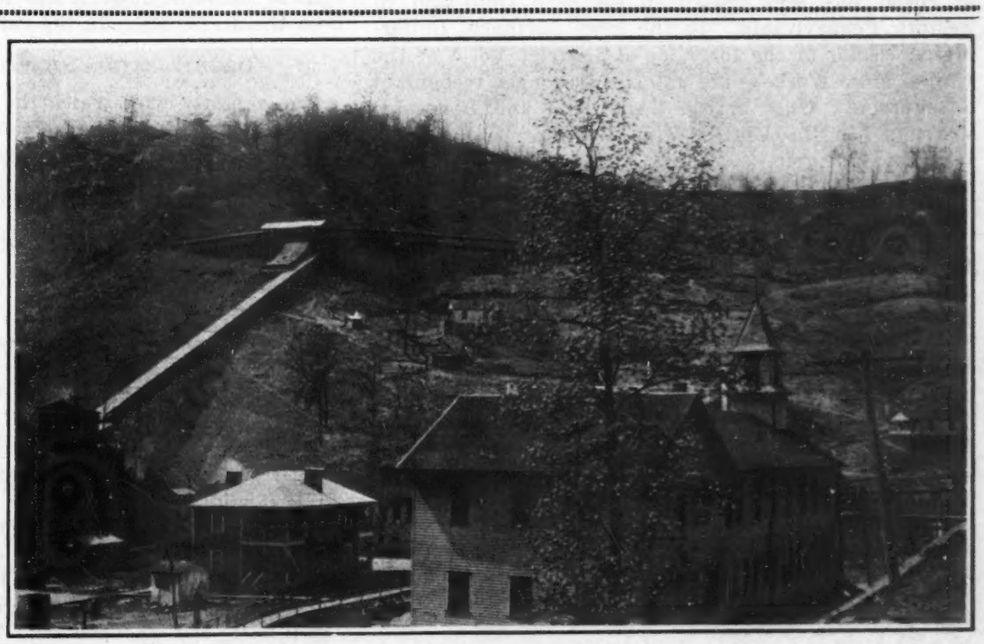
NITROSITES AND SILVER DETONATORS—The nitrosites have been patented as initiators of explosion. Little is known of their structure and properties. As amylene nitrosite is stable and representative of the group, it has been chosen by the U. S. Bureau of Mines for a study of its structure and properties. The method of its preparation was studied, its structure determined, and a method developed that gave a yield of about 50 per cent theoretical.

In connection with the general study intended to develop new uses for silver, research work on detonating silver compounds has been undertaken. The silver salts that are considered to have explosive properties have been made and tested. Their sensitiveness to heat and impact and explosive strength were determined. Experimental work has been conducted with silver azide, silver fulminate, the silver salts of some of the nitro-aromatic compounds and silver oxalate. Work has been completed on silver acetylide and the silver salt of trinitrohydroxyaminobenzene. Other silver compounds were tested but did not have any of the essential properties of an explosive.

OXYGEN OIL EXPLOSIONS—An investigation intended to determine the conditions under which compressed air or oxygen in contact with hydrocarbon and other oils may be subject to explosion hazards, and to devise means of safeguarding against such hazards, is being conducted at the Pittsburgh, Pa., experiment station of the U. S. Bureau of Mines. Since the publication of previous results, the explosibility temperatures for eleven additional substances have been determined in the 4-cc. test bomb using high-pressure oxygen. A number of experiments was also made using low-pressure oxygen, high-pressure air, and a mixture of oxygen and helium.

In the Hazard Field

This school building and mine of the Sapphire Coal Co. are located on First Creek in the Hazard Field of Kentucky. Formerly the First Creek Mining Co. under the management of Jewett, Bigelow & Brook, it is now operated by the Blue Diamond Coal Co. of which W. H. Sienknecht recently was made general manager.



Labor History of Appalachian Coal Region Records Unionism's Utter Failure

By Sydney A. Hale
Special Contributor, *Coal Age*,
New York City

THERE is a striking parallelism in the history of union activities in the four states discussed in this article. In each case organized labor gained a foothold in its salad days and in some instances it was able to maintain that foothold for several years. But in each case the United Mine Workers was dislodged and, after a period of guerilla tactics, ceased to be a factor. The World War revived the hopes of the labor leaders and made the operators less determined in their resistance to the union program. The United Mine Workers made gains, tremendous gains in those days. But not a single victory was permanent. In these four states, as elsewhere, there has been a challenge to union leadership which has not been met.

THE POSITION the United Mine Workers holds today in the great Appalachian Region is the weakest since organized labor began to exercise a national influence in bituminous coal mining. In northern West Virginia, the last strongholds of the Lewis organization in that state are tottering: the southern fields have been swept completely beyond the control of Indianapolis. The dubious lease of power in the Upper Potomac-Georges Creek area has been broken. The skeleton organization maintained by the United Mine Workers in eastern Kentucky and Tennessee is now only a shadow which frightens nobody with pretensions of authority. Alabama, drawn back into the union ranks during the World War, again proclaims its ability to conduct its affairs without the advice or assistance of the international body of mine workers.

Central Pennsylvania, for years a fertile field for union propaganda, has, with the exception of a few operators, abandoned the labor organization headed by John L. Lewis. Strong union counties in that coal field have followed Somerset into the non-union fold. As was related in an earlier article in this series, the banner of revolt has been raised in southern Ohio and in western Pennsylvania. In the more northerly Butler-Mercer sector of the territory of District No. 5 of the United Mine Workers the union is no longer recognized as supreme. Only in the Broad Top and Blossburg districts has the United Mine Workers been able to retain a tight grip.

UNION MAKES NO GAINS

To this catalog of losses there are no offsetting gains to be chalked up for the union. Westmoreland County, aggressively non-union for many years, still remains hostile to organized laobr. The Connellsville district, in which Mr. Lewis' organization gave an unexpected demonstration of power in the general strike of 1922, has been restive in recent months as a result of agitation for increased wages by the independent operators, and there have been some labor disturbances, but no general movement to demand union affiliation or recognition. The Windber sector, another quarter in which the union had a brief success three years ago, is quiet. The action of the largest operator in that section in reducing wages several months ago provoked no unpheavals, notwithstanding the fact that this particular producer had normally maintained its rates on levels as high as those prevailing in the union fields. Despite rumors some time ago that the union would make a renewed drive on southern West Virginia, the surface of labor relations there is unruffled.

The measure of disintegration which has taken place can best be understood when it is remembered that at one time or another the power of the United Mine Workers—or one of its predecessors in interest—has been felt in every state and in every district in the Appalachian Region. The process, as succeeding paragraphs will disclose, has not been uniform. Neither has it been constant. In some cases the tide of union power has ebbed and flowed. The union has staged some striking "come-backs" in fields where it was generally believed that its influence had been irretrievably shattered. In certain other sections, influence painfully and gradually built up over a long period of years has vanished almost over night. The most significant development since the close of the World War, however, has been the acceleration in the rate of disintegration.

DISINTEGRATION SHARPLY ACCELERATED

The rapidity with which the tide has set in against unionism in the great coal belt extending from Pennsylvania through Ohio, Maryland, the Virginias, eastern Kentucky and Tennessee to Alabama threatens to blot out, in the popular mind, recollection of just how powerful the United Mine Workers has been in this region in days gone by.

Vigorous efforts to organize Alabama were made early in the history of the United Mine Workers, but the captive mines of the steel companies proved a stumbling block in the path of the union. Those mines in 1904 upset an arbitration award of the preceding year, claiming the scale fixed too high—and then offered concessions to avoid a strike. These concessions were rejected. A bitter struggle ensued, terminating in the disruption of the joint agreement which had been negotiated between the union and the commercial mines and the collapse of the union organization in that state in September, 1908. From that time until 1917 the right of the Alabama operators to run their mines on an open-shop basis was uncontested. Union membership dwin-

Sixth of a series of articles describing the changes in the labor status of the different bituminous coal producing districts of the United States in recent years. Preceding articles appeared in *Coal Age*, Sept. 25, Oct. 1, 8, 29 and Nov. 19. Another article will appear in an early issue.

dled from a peak of 10,668 in December, 1902, to a nominal figure.

The war, however, gave the union another opportunity to make an organization drive in the state. By June, 1917, the union was claiming an enrollment of 17,000 members, but official figures as of December, 1918, showed only 6,885 out of a total of 26,221 workers although a contract between the operators and the United Mine Workers was in force on the latter date. This contract, negotiated under the direction of the United States Fuel Administration, did not grant the check-off or the

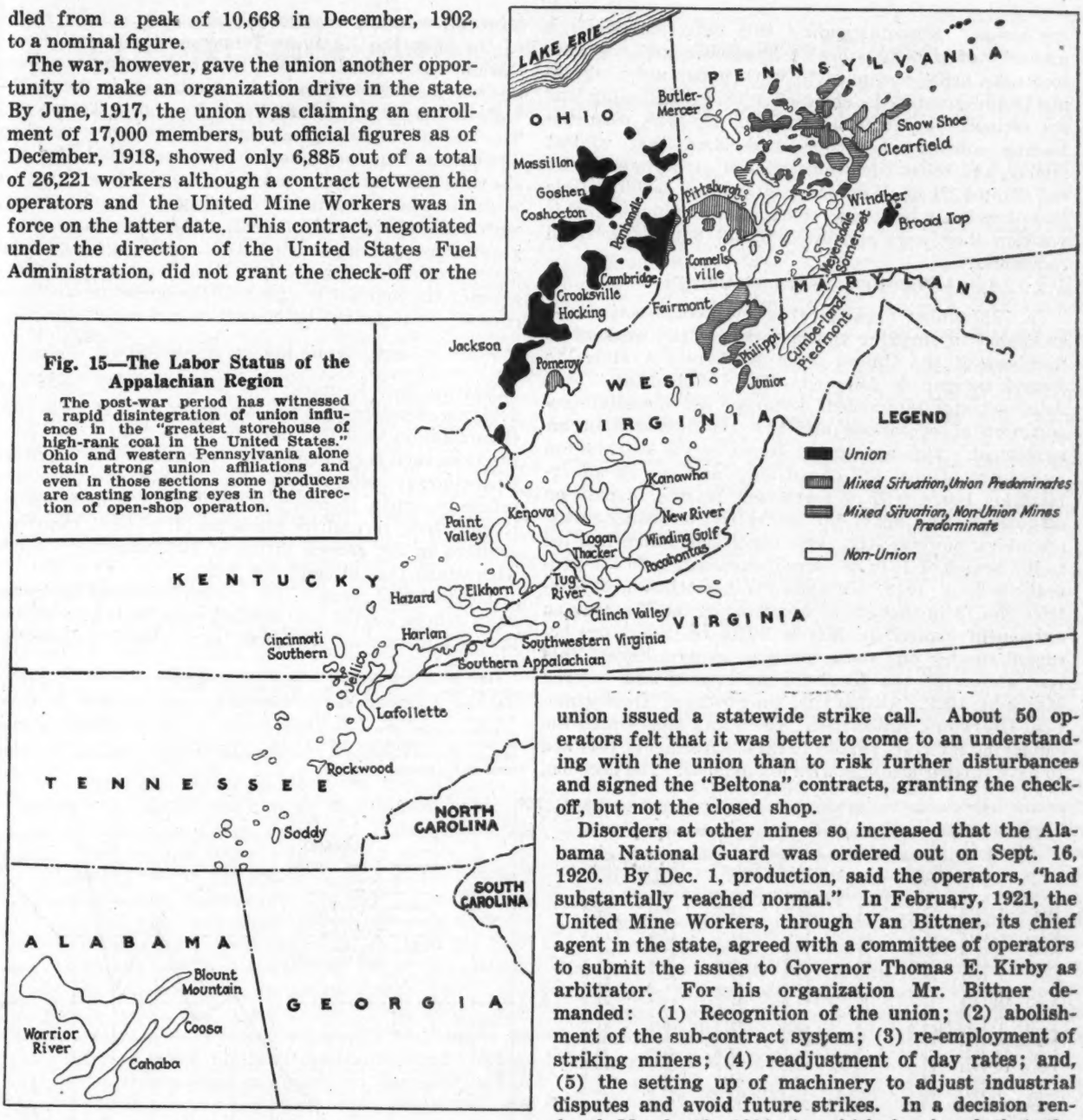


Fig. 15—The Labor Status of the Appalachian Region

The post-war period has witnessed a rapid disintegration of union influence in the "greatest storehouse of high-rank coal in the United States." Ohio and western Pennsylvania alone retain strong union affiliations and even in those sections some producers are casting longing eyes in the direction of open-shop operation.

closed shop. It "was by its terms to continue until April 1, 1920." Nevertheless, the union called out its Alabama miners in the general strike of 1919.

With the expiration of the "Garfield agreement" in 1920, the United Mine Workers renewed its campaign for greater recognition. Several operators did acquiesce in demands for fuller recognition—but without the check-off—and agreed to the so-called "Blue Book" contracts. A number of other producers agreed to the scale of wages fixed by the award of the United States Bituminous Coal Commission and to an extension of the general provisions of the Garfield agreement. These contracts, signed with the individual employers, whose action had the approval of the union, were known as "White Book" or "Ruby" contracts.

Local strikes in May, 1920, induced about 30 producers who had been operating under Ruby contracts to sign the Blue Book agreements. Unsettled labor relations marked the midsummer and on Sept. 7 the union issued a statewide strike call. About 50 operators felt that it was better to come to an understanding with the union than to risk further disturbances and signed the "Beltona" contracts, granting the check-off, but not the closed shop.

Disorders at other mines so increased that the Alabama National Guard was ordered out on Sept. 16, 1920. By Dec. 1, production, said the operators, "had substantially reached normal." In February, 1921, the United Mine Workers, through Van Bittner, its chief agent in the state, agreed with a committee of operators to submit the issues to Governor Thomas E. Kirby as arbitrator. For his organization Mr. Bittner demanded: (1) Recognition of the union; (2) abolishment of the sub-contract system; (3) re-employment of striking miners; (4) readjustment of day rates; and, (5) the setting up of machinery to adjust industrial disputes and avoid future strikes. In a decision rendered March 19, 1921, in which he found that the miners had no grievances as to living conditions, working hours and wages, the Governor rejected all the Bittner demands. Since that time the union has been without standing in the state. In the general strike of 1922. the Alabama mines worked steadily.

Union vs. Non-Union Tonnage Rates

Base pick-mining rates in the Central Competitive Field increased 47c. per ton between April 1, 1912, and Jan. 1, 1923. During the same period base rates in Alabama increased 20 to 37c. per ton. The Alabama record in detail is shown in Table VIII.

The union has had a checkered career in eastern Kentucky and Tennessee. The first organization drive in the last named state was made about the same time that the union launched its membership campaign in Alabama. The first test of strength was made in 1904-5 when the furnace operators of the state, like the captive mines in Alabama, refused to be bound to

the union. Notwithstanding this defection, a large majority of the operators in Tennessee and adjacent Kentucky fields continued to work under union agreements and granted the check-off. This relationship was not seriously disturbed until March 31, 1910, when the leading commercial producers declared that wildcat strikes and other conditions winked at or imposed by the United Mine Workers had grown so intolerable that they could no longer recognize the union. In this position they were supported by all but a few small companies.

WAR REVIVES UNION DRIVE

In 1917 union organizers again became active and succeeded in enrolling the majority of the workers as members of the United Mine Workers. A strike to compel recognition followed. The United States Fuel Administrator intervened, demanded an immediate resumption of operations and the consummation of an agreement. This agreement, known as the Washington agreement, denied the closed shop and set up an arbitration board with a permanent referee to pass on disputes arising under the contract. According to the operators, however, the same conditions which had led to the breach of 1910 developed, culminating in the general strike of 1919. In spite of the inclusion of District No. 19 in that strike order, when the Washington agreement expired in March, 1920, the operators accepted another one along the same general lines. This was known as the Knoxville agreement and expired March 31, 1922. At that time the Southern Appalachian Coal Operators' Association, which had represented the employing interests parties to these agreements, declined to have further dealings with union labor. The decision, however, was not unanimously approved. As a result of the split the Kentucky-Tennessee Operators' Association was formed to take in the deserting members and non-members of the older organization in the southeastern district of eastern Kentucky and in Tennessee.[1] The junior organization entered into an open-shop agreement with the miners. This contract denied the check-off and carried a provision for readjustments in wages to meet competitive conditions. This agreement, with a downward readjustment, was renewed for a four-year term beginning April 1, 1924. Although signed by district officials of the United Mine Workers, the character of the contract is such that the operating districts covered by it cannot be classed as union territory.

OPEN-SHOP POLICY ABANDONED

Northeastern Kentucky has been non-union since the field was developed. Two companies in that field—the Consolidation Coal Co. and the North East Coal Co.—ran open-shop for a number of years and made no effort to discourage union membership. These companies now refuse to employ members of the United Mine Workers, basing their refusal on the attempt to close their operations in the general strike of 1922 and the violence with which that attempt was made.

The fact that many of the companies operating in the Appalachian Region deal directly with their men makes the publication of complete rate sheets impossible.

[1]The Southern Appalachian Coal Operators' Association covers operations in Bell, Knox, McCreary, Whitley, Clay and Laurel counties, Kentucky, and in Tennessee. Approximately 80 mines with a maximum capacity of 7,000,000 tons per annum and an actual output of nearly 5,000,000 tons in 1924 are members. The Kentucky-Tennessee Operators' Association at the time of its organization reported a membership of approximately 3,000,000 tons per annum.

Table VIII—Alabama Basic Wage Rates (in Cents)

	Mining Rate* Per Ton	Hours Worked	Day Labor Rates per Hour — Inside Labor — Motormen	Trackmen	Outside Labor — Tipple Foremen	Common Labor
Dec. 1, 1914	52.0	10	20.0	27.0	18.0	14.4
Sept. 1, 1915	57.7	10	22.2	30.0	20.0	16.0
Feb. 1, 1916	60.0	10	25.0	32.5	22.0	16.5
Nov. 1, 1916	66.0	10	27.5	35.5	24.0	18.0
May 1, 1917	72.6	10	30.2	39.0	26.4	19.8
July 1, 1917	79.2	10	33.8	42.6	28.8	21.6
Oct. 1, 1917	88.5	10	35.7	46.1	31.2	23.4
April 16, 1918	95.7	10	40.0	51.5	34.8	27.2
Dec. 1, 1919	97.0	8	57.0	73.4	57.7	40.1
April 1, 1920	109.0	8	60.0	77.2	60.1	41.2
March 16, 1921	80.0	8	50.0	58.5	50.0	32.0
July 20, 1921	70.5	9	44.0	47.0	44.0	28.0
Dec. 16, 1921	61.5	9	38.5	43.0	38.5	20.0
June 1, 1922	68.5	9	39.5	43.0	41.0	21.0
Sept. 1, 1922	82.0	9	47.5	51.5	49.0	26.5
March 16, 1923	94.0	9	53.5	57.0	55.0	30.0

* Pratt Seam.

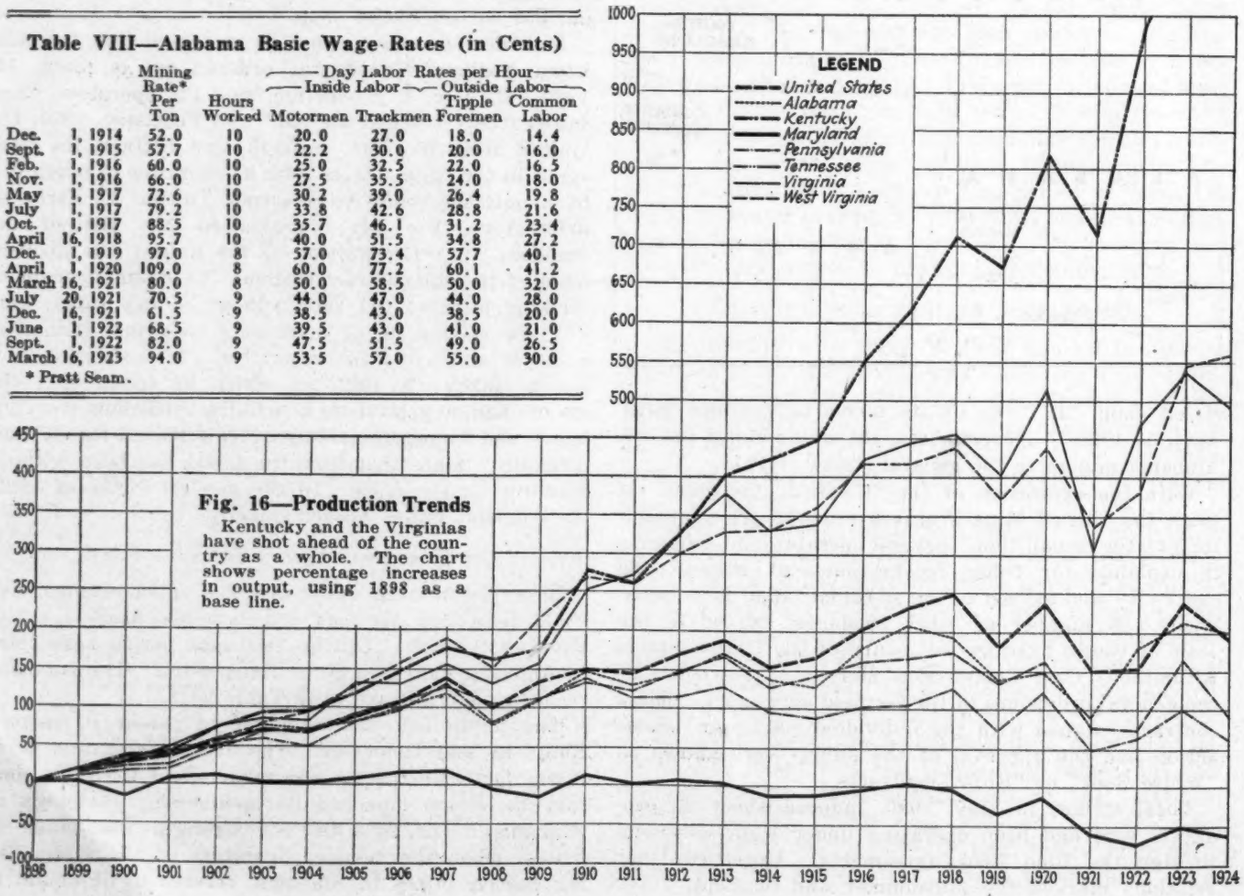


Fig. 16—Production Trends

Kentucky and the Virginias have shot ahead of the country as a whole. The chart shows percentage increases in output, using 1898 as a base line.

Table IX—Changes in Pick-Mining Rates in Appalachian Region: 1912-1923

(Rates in Cents per Net Ton)

	Jan. 1, 1912	1912 Jan.-June	1912 July-Dec.	1913 Jan.-June	1913 July-Dec.	1914 Jan.-June	1914 July-Dec.	1915 Jan.-June	1915 July-Dec.	1916 Jan.-June	1916 July-Dec.	1917 Jan.-June	1917 July-Dec.	1918 Jan.-June	1918 July-Dec.	1919 Jan.-June	1919 July-Dec.	1920 Jan.-June	1920 July-Dec.	1921 Jan.-June	1921 July-Dec.	1922 Jan.-June	1922 July-Dec.	Jan. 1, 1923
District:																								
Central Competitive Field Base Rate...	58.0	61.0	61.0	61.0	61.0	61.0	61.0	61.0	61.0	64.0	64.0	74.0	84.0	84.0	84.0	84.0	95.0	108.0	108.0	108.0	108.0	108.0	108.0	108.0
Alabama:																								
Pratt Seam...	57.8	57.8	57.8	57.8	57.8	57.8	52.0	52.0	57.8	60.0	66.0	72.6	85.8	95.7	95.7	95.7	97.0	109.0	109.0	80.0	61.5	68.5	82.0	82.0
Kentucky:																								
Eastern.....	31.3	31.3	31.3	31.3	31.3	31.3	31.3	31.3	31.3	31.3	31.3	31.3	33.3	33.3	54.2	54.2	65.5	75.0	87.0	66.0	66.0	61.0	78.0	78.0
Northeastern.	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	50.0	60.0	75.0	75.0	100.0	100.0	114.0	114.0	125.0	90.0	90.0	75.0	90.0	90.0
S. Applachian	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	63.0	73.0	90.0	90.0	90.0	90.0	108.0	114.0	114.0	114.0	90.0	90.0	114.0	114.0
Maryland:																								
Cumberland-Piedmont...	56.3	58.5	58.8	58.5	58.5	58.5	58.5	58.5	58.5	60.7	67.0	83.5	93.7	93.7	93.7	93.7	106.6	117.4	117.4	117.4	117.4	117.4	117.4	117.4
Tennessee:	49.3	49.3	49.3	49.3	49.3	49.3	49.3	49.3	49.3	49.3	53.7	59.2	68.9	68.9	68.9	68.9	78.7	78.7	90.9	90.9	68.9	68.9	90.9	90.9
Virginia:	24.2	24.2	33.3	33.3	33.3	33.3	33.3	33.3	33.3	34.8	34.8	42.4	53.0	53.0	53.0	53.0	60.6	68.2	81.8	65.2	59.1	51.5	78.8	78.8
West Virginia:																								
Pocahontas...	43.0	43.0	43.0	34.4	34.4	34.4	34.4	34.4	34.4	39.5	43.4	47.7	61.0	61.0	61.0	61.0	64.5	75.2	90.3	72.2	72.2	57.6	90.3	90.3
Thacker.....	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9	38.2	45.6	45.6	45.6	45.6	45.6	45.6	45.6	45.6	45.6	52.1	69.5	69.5

Table IX, however, gives a history of typical changes in pick-mining rates in the Appalachian Region and, for comparative purposes, also shows the base rate in the Central Competitive Field. The most pronounced changes, it will be noticed, began during the war period. In some cases non-union rates during the war and the post-strike boom months exceeded Central Competitive Field base rates. On the other hand, rates during periods of depression more nearly reflect actual conditions in the open-shop districts than is the case in the strong union fields. The non-union rates quoted in Table IX are, it should be emphasized, typical rather than complete. Many operations in the same fields paid lower than the rates named: in a few instances, higher rates were paid.

Union Had Early Start in Maryland

The Maryland coal field first felt the influence of unionism in 1881 when the old Knights of Labor invaded the Georges Creek and Upper Potomac districts and gained enough recruits to cause a strike in 1882 which lasted nearly six months. The walk-out was a protest against a reduction of 15c. per ton in the mining rate and was unsuccessful. Two increases after the men had returned to work, however, restored the basis for which the men had struck. A cut of 10c. late in 1884 was followed by a strike in March, 1886: this lasted six weeks and ended in the defeat of the men. Twelve years passed before organized labor again became active: in 1898 and 1899, the United Mine Workers launched a membership campaign in Maryland and on April 1, 1900, ordered a general strike for an advance of 10c. per ton more than the operators already had announced. The strike was broken after four months and the union retired from the field.

Open-shop conditions without a suggestion of union recognition prevailed until the World War period. Organization work was renewed early in 1917 and a two-day strike staged in April, 1918. Out of this grew a joint agreement between the operators and district and local officials of the United Mine Workers acting "in behalf of the mine workers." With the general strike of November, 1919, this agreement was thrown into the discard. No action looking toward a resumption of contractural relations was taken until nearly a year later, when a committee of employees requested a joint conference. The principle of collective bargaining was again recognized in an agreement to expire March 31, 1922, but there was no direct recognition of the union as such.

At the insistence of union representatives, however, a provision calling for a joint meeting in January, 1922, to continue the contract was incorporated in the agreement. Meetings were accordingly held in January and adjourned, at the miners' request, until after the convention of the international union at Indianapolis. Late in March, 1922, the operators demanded another conference or an agreement to continue work under the expiring contract. Despite this demand, a strike was called on April 1 and the representatives of the miners stated that "they would have to defer the conference until matters at issue in the Central Competitive Field were settled." Some months later (August 18, 1922) the operators notified the employees' representatives that they (the operators) deemed the action of the employees' representatives a violation of the basic agreement of Dec. 11, 1920 and "that they considered the agreement terminated."

Maryland Shakes off Union

The attempt of the majority of the Maryland mines to operate open-shop after April 1, 1922, was met with a counter-campaign of intimidation and violence which ran throughout the greater part of 1923. This warfare was waged by union sympathizers notwithstanding the willingness of the producers to pay wages in line with the levels fixed in the 1920 agreement. The international organization, which during this long conflict had been able to induce only a few small mines to sign up, finally acknowledged defeat in an order calling off the strike on Nov. 23, 1923. Nearly $750,000 had been poured into the state by Indianapolis in the futile effort to force recognition.

At the time the United Mine Workers was beaten in 1900, the basic pick-mining rate in Maryland was 55c. per gross ton. During the period (1900-1919) in which the state was free from union dominition, the rate advanced to $1.194 with proportionate increases in day rates. The history of pick-mining rates in the state since Jan. 1, 1855, is shown in Table X.

Table X—Pick-Mining Rates in Maryland

(In Cents per Gross Ton)

Jan. 1, 1855	35.0	1882–83*	50.0
June 1, 1855	40.0	Nov. 15, 1884	40.0
Jan. 1, 1862	30.0	March 1, 1887	50.0
Sept. 1, 1862	45.0	April 1, 1894	40.0
June 15, 1863	50.0	April 1, 1896	45.0
April 1, 1864	60.0	April 1, 1900	55.0
Jan. 1, 1864	70.0	April 1, 1903	65.0
Sept. 1, 1864	100.0	April 1, 1904	60.0
June 1, 1865	75.0	April 1, 1910	63.0
May 1, 1866	65.0	April 1, 1912	65.5
June 1, 1877	50.0	Jan. 16, 1916	68.0
Aug. 1, 1877	55.0	Oct. 16, 1916	75.0
March 1, 1878	40.0	March 1, 1917	85.0
Oct. 15, 1879	50.0	May 1, 1917	93.5
Feb. 1, 1880	65.0	Nov. 1, 1917	104.7
March 15, 1882	50.0	Nov. 16, 1919	119.4
Sept. 7, 1882	40.0	April 1, 1920	131.5

* Exact dates not available.

Center Shearing Increases Percentage of Lump

BY N. D. LEVIN*
Columbus, Ohio

What would an appreciable increase in the amount of lump obtained in mining mean to the coal producer? To some the percentage of lump makes no difference; to others a goodly yield of large sizes is of the utmost importance, spelling all the difference between a profit and a loss. Ways and means for increasing the proportion of lump coal are most interesting to those to whom large sizes are important, but the same methods help

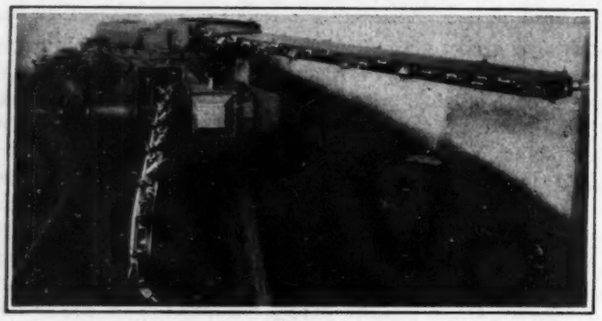


Fig. 1—Combined Shearing and Center Cutter

This machine both center cuts the face and shears it at the same time. The shearing cutter gets out of the way of the swinging bar by the time it reaches the center of the room. The shearing bar can also be attached to a machine arranged for undercutting the face.

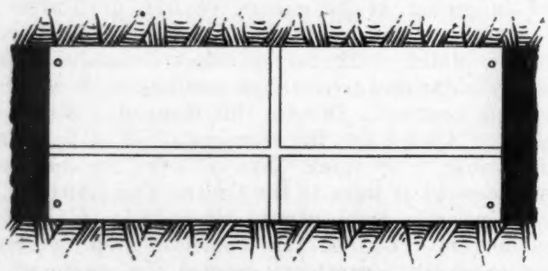


Fig. 2—A Face Center Cut and Center Sheared

This drawing also shows the locations of the four shotholes necessary to bring down the coal. Machines already are available for undercutting and shearing the face as well as for topcutting and shearing it. In any case a loose end of coal is made available.

those operators who have other adverse conditions such as weak roof with which to contend. Inasmuch as less explosives are employed, the roof is subjected to less violent jarring, and a smaller quantity of timbering is required.

As every mining man knows, a shear cut in a coal face makes a "loose end," that is, it exposes an additional face of coal to the air and renders it much easier to shoot. Such a shearing cut may be made either simultaneously with the undercut or center cut, or it may be put in either before or after the horizontal cut has been made.

In the accompanying illustrations, Fig. 1 shows a combination machine adapted to making both of these cuts simultaneously. In use, both cutterbars are sumped at the same time. When the machine has been brought up to the face the vertical bar starts its downward sweep at the same time that the horizontal bar starts its swing.

*Chief engineer, mining department, Jeffrey Mfg. Co.

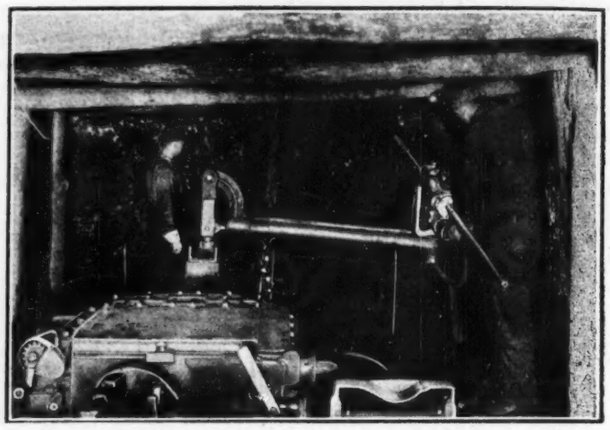


Fig. 3—Power Drilling the Shotholes

A counterpoised power drill may be mounted readily on the cutting machine in such manner that the machine runner can drill one shothole and the helper the other during the time that the two cuts are being made in the face.

The shearing bar is out of the way by the time the swinging bar reaches center. Fig. 2 shows the face of a room cut in this manner. A somewhat similar treatment of the face, preferred in many localities, is shown in Fig. 4. Here the horizontal cut is made at the bottom of the coal instead of in its center.

Naturally, undercutting and shearing may be performed separately, a machine being used for each of these operations. An electric drill may be mounted readily on a shearing machine so that the shot holes may be power drilled while the shearing cut is being put in. Only two holes are required in a center-sheared face and the quantity of explosive employed is appreciably reduced because of the loose ends resulting from the shearing cut. Less powder means less jarring of the roof which in turn means that fewer or smaller timbers will be needed for its support.

Snubbing the face is also an efficient means of increasing the percentage of lump coal. Various machines and methods are available for this purpose. It is questionable, however, if this will yield results comparable with center shearing. Machine loading puts bigger lumps onto the cars than hand loading because pieces

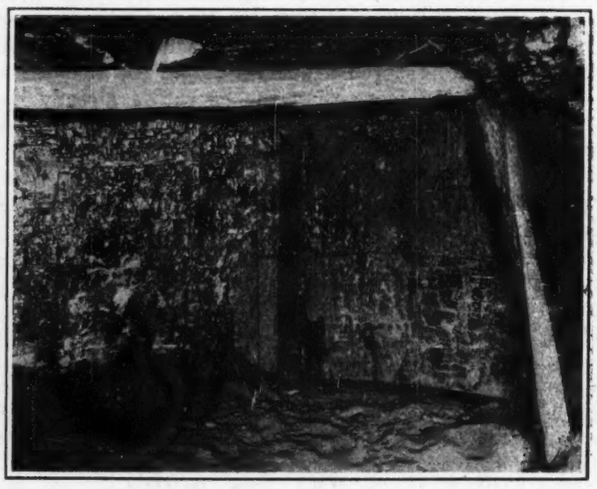


Fig. 4—A Face Undercut and Sheared

The two shotholes may be seen upon either side of the shear cut approximately above the sides or extremities of the undercut. This face is now ready for loading and shooting. The shear cut takes the place of the center drill hole and because of the loose ends only light charges of explosives are needed in the side holes. Thus the roof is subjected to light jarring only.

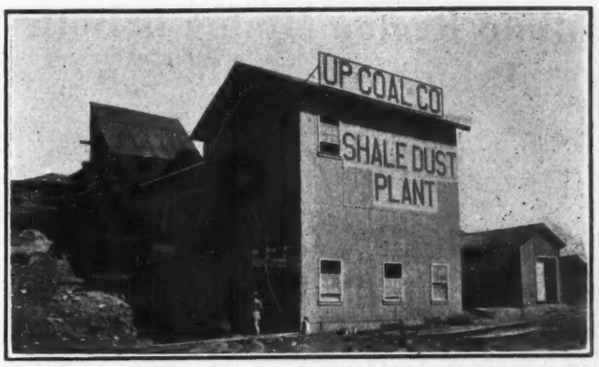
can be gathered onto the machine conveyor so big that they could not be lifted aboard a car by hand.

There is small question but what center shearing of the coal face in the future will receive far greater attention on the part of coal operators than it has in the past. This will be particularly true in those localities where conditions are highly competitive and a domestic grade of bituminous coal is produced. Some of the largest operators in southern Illinois have for months been experimenting with shearing machines with highly promising results. Its other advantages, however, in addition to the greater production of lump coal made possible, (such as decreased use of explosive and timber, and less jarring of the roof) will render it highly attractive to operators in other coal regions.

Union Pacific Grinds Its Own Shale Dust

To provide a suitable rock dust for use in its mines the Union Pacific Coal Co. has erected at Mine No. 7, Rock Springs, Wyo., a shale dust plant, the site chosen being a short distance from the power plant. As the mine does not afford good material and as the crop reveals little but sandstone, it has been necessary to bring the material for pulverizing a long distance, in fact eight miles. A white shale is found in White Mountain (which, indeed, takes its name from the prevalence of the rock) and it is of excellent quality as Table I, provided by the U. S. Bureau of Mines, will show.

The plant, which was supplied by the Williams Patent Crusher & Pulverizer Co., has a capacity of over seven tons per 8-hr. day. The dust is sacked at the mill and distributed to the various mines. At present the rock is hauled by motor truck at a cost of $2.60 per ton. The hope is that the whole labor and material cost of obtaining and manufacturing the dust can be brought to $4 per ton as soon as the rock is transported by railroad from the Green River region where an identical rock is to be found. The Union Pacific Coal Co. is furnishing the dust to commercial mines in the vicinity which have not yet made provision for meeting the safety needs of their mine by plants of this kind. The shale is put in sacks holding 70 lb. The cost of operation of the plant is shown in Table II. The pulverizing and sacking are done alternately and two men are employed in both operations.



Dust Mill Protects Wyoming Mines

The Union Pacific Coal Co. at Rock Springs, Wyo., pulverizes its own rock dust from shale obtained from a deposit in White Mountain. It has a low free silica content and is ground so that nearly 90 per cent goes through a 200-mesh screen. The dust is light enough to aid considerably in illuminating the headings.

Table I—White Mountain Shale of Union Pacific Coal Co.

	As Received	Moisture Fre
Moisture at 105 deg. C	2.0	....
Ash	82.8	84.5
Carbon dioxide	11.0	11.2
Combined water (above 105 deg. C)	3.5	3.6
Total incombustible	99.3	99.3
Combustible (by difference)	0.7	0.7
Free silica or quartz SiO_2 estimated		8 per cent
Size test		Cumulative per cent
Through 20-mesh		100.0
Through 200-mesh		88.2

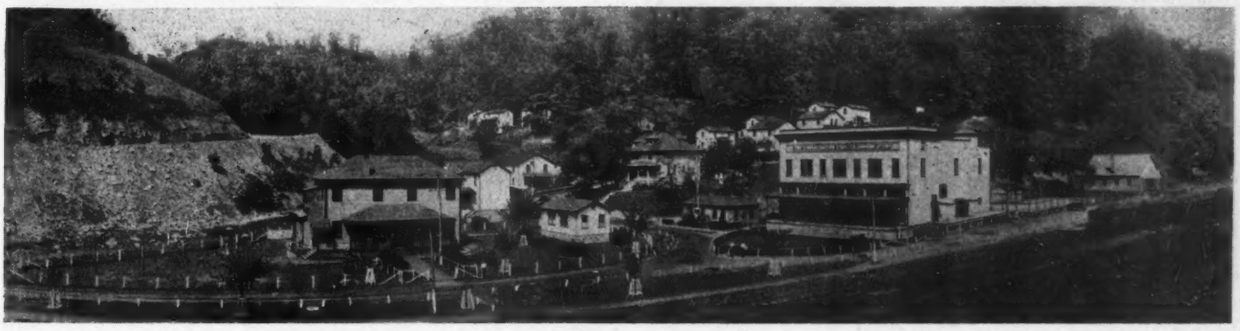
MICROSCOPIC EXAMINATION

This dust is of a yellowish cast, yet light in shade, microscopically there appears to be but little free silica or quartz (SiO_2), probably less than 5 per cent. There is from 10 to 15 per cent of calcite ($CaCo_3$) in the sample. The rest is largely kaolin or other clay minerals with a few micas, etc.

Table II—Operating Costs of Rock Springs Shale-Dust Plant, August, 1925

Crushed		
1,856 bags		111,360 lb.
Hauled from pit		57 tons
Total operating time		6¼ hr.
Sacking		3¼ hr.
Delays during operating time		7¼ hr.
Costs		
Raw shale 57 tons @ $2.60		$148.20
Machine shopwork on hammers, etc.	$11.31	
Repairing belts	5.29	
Repairing bearings	2.27	
		18.87
Operating		
6¼ hr. @ 90¾c.	55.81	
6¼ hr. @ 86¼c.	53.35	
		109.16
Sacking		
3¼ hr. @ 90¾ c.	30.85	
3¼ hr. @ 86¼c.	29.49	
		60.34
Material		
Belt dressing and lubricants	1.66	
Breaker plate	10.14	
		11.80
		$348.37
Tons per hour 0.90536		
Tons per 8-hr. day 7.2429		
Cost per ton $6.26		
Cost per bag $0.188		

No depreciation, taxes or insurance considered.



An Up-to-Date Mining Community Fostered by the Consolidation Coal Co.

This is the mining town of Dunham, located near Jenkins, Ky., which with Burdine forms the group of model mining communities where the Consolidation Coal Co. produces 1,200,000 tons of coal per year. At Dunham the miners and their families do not live in hovels common to many coal towns, but here they have modern, well-kept homes and many have their own gardens. The "town square" exemplifies the cleanliness that prevails throughout the community.

Minto Region Mining Is Both Primitive and Modern

This New Brunswick Field Has Hand-Power Haulage of Tiny Cars on Wooden Rails in One Section and Electric Cutters in Another

By John McNeill
North Minto, New Brunswick

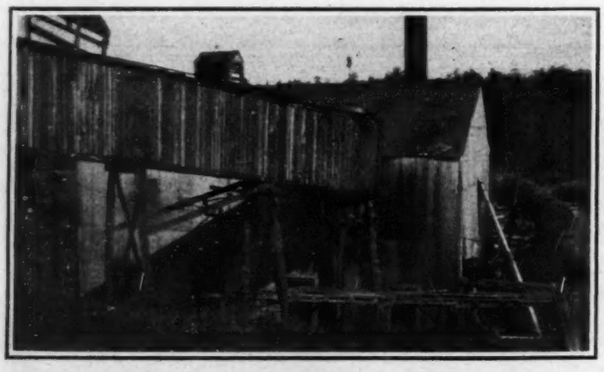
Extensive and complicated timbering and a potpourri of primitive and modern coal mining methods and equipment ranging from electric cutters back to hand-power haulage of tiny cars with wheels like those of a baby carriage are to be seen in the little-advertised Minto region of New Brunswick, Can. The district is in Sudbury and Kings counties. It is the only coal field in operation in the province, and so far as is known contains the only coal bed in New Brunswick, with the exception of an extremely thin measure at a place called Barryville.

In thickness the coal throughout the Minto field does not average more than 28 in. but it has been worked in places scattered over a distance of about 6 miles north and south. The breadth of the operated area is not more than a mile but the total extent of the field has not been determined.

This coal field deserves consideration because of the difficulty encountered in working it in competition with richer fields. The roof is bad and the coal thin and hard. The field also is troubled seriously with water. It thus possesses most of the disadvantages encountered in mining and to operate in it requires as careful study as fields where the output from a single shaft reaches 10,000 tons a day.

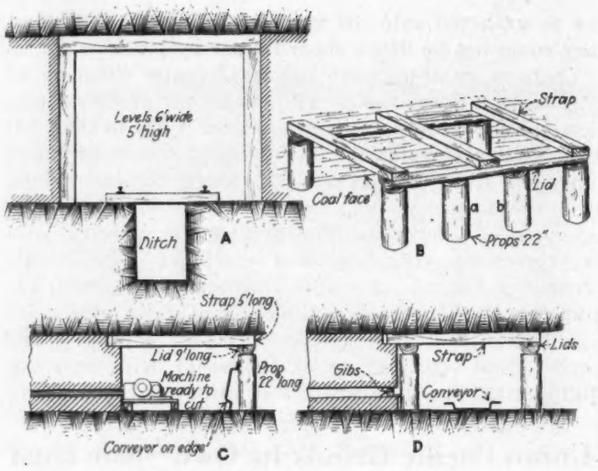
As a whole this district is divided into two sections known respectively as South Minto and North Minto. The southern section has been longer in operation. Here the coal crops out and in the past has been won by strip mining. The output was not large, however, for in many places as much as 20 ft. of earth had to be removed to expose 20 in. of coal.

Most of the coal throughout this region is now reached by shafting. All over the field there are many small shafts from 50 to 100 ft. deep. The system of mining is board and pillar. The boards are 15 ft. wide and the pillars are of equal width. It is unusual to see a thin bed of coal worked by board-and-pillar. Some



Minto Power Plant Supplies the Mine and Town

This plant generates the current necessary for the operation of the mining machines underground, the pumps employed in mine drainage and for lighting the town and vicinity of Minto. Its capacity is about to be substantially increased in order to meet the requirements of the steadily growing load.



Details of Drainage and Timbering

Water is extremely troublesome in these mines. Ditches for its removal are dug in the center of the tracks on all headings and by headings as shown in *A*. The machine faces are timbered by posts upon which rest lids or booms extending parallel with the face. Across these and supporting the roof, straps or beams are placed which are hitched into the face at their opposite ends. As the face is undercut additional posts and booms are set under the forward ends of these straps, thus relieving the face of all roof pressure. In *B* the props *a* and *b* are thick and are called "breakers." They are set before the machine cuts because the roof is troublesome.

day a longwall system may be tried by hand mining. The main difficulty will be that of keeping the road roof and sides from crushing and blocking the entrances.

In South Minto the roof is so soft that the coal is mined, or "stripped" as it is called, by hand picks. During this process, however, the roof has to be supported by short boards driven over a running boom from behind. The boards, called "laths," are 4 ft. in length, 6 in. or more in width and 1 in. thick. The running boom or "lid" is, of course, completely covered with laths, so that when the coal is extracted, a roof of wood remains all over the place. If care is not taken in placing the laths the roof may run down until it chokes itself. It will be seen that the skill of a builder as well as that of a miner is here required.

In these mines the cars hold only 5 cwt., or 560 lb. of coal each. They run on wooden boards 6 in. wide nailed to the ties. The wheels of the cars are like those of a baby carriage, but they run all right when the wheeler becomes accustomed to keeping them on the boards. The art of mining is developed in South Minto to as high a pitch as in "aristocratic" mines. Men work there who have mined coal in all parts of the earth, and they buy "moonshine" and motor cars, and swear, and go to church, and have dances—"even as you and I."

North Minto is different. Two companies are in operation there employing some 500 men. The shafts are about 100 ft. deep and the bed of coal is 2 ft. 2 in. thick but carries a 4-in. parting of "mud," as it is called locally. This mud is in reality a hard rock, and rests on 5 in. of bottom coal. The total height of the working is thus from 2 ft. 6 in. to 2 ft. 8 in. In this locality the roof is shale, easy to break, full of slips and joints which run in all directions and contains "pots," which if not carefully watched are sure to fall out. In such places the rock arrangement appears to be such that if one piece falls out, a bigger one will follow.

The following timbers are used for roof support: "Lids" or split booms 6 ft. long used to protect roadway

roofs; "straps," planks 6 ft. long 2 in. thick and 6 in. wide, used along the face; "laths," boards 4 ft. long 6 in. or more wide and 1 in. thick used in whatever way may be required, and props of various lengths from 20 in. to 6 ft. A timberman is kept busy on the bankhead cutting timber and sending it into the mine.

In this locality also the bed is worked on the board-and-pillar system. The coal is so hard it cannot be dug with a hand pick and, accordingly, is shot from the solid. Naturally, in a thin bed such as this the results are not good. Even in the thinnest pillar, explosives must be used to bring the coal down. It never crushes as it does in some thin beds, and even a small nose is hard to cut.

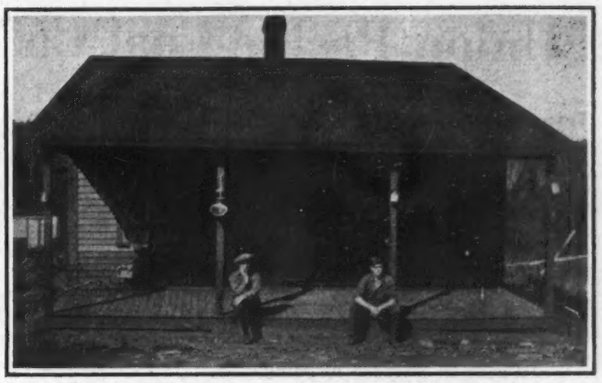
Water constitutes a big obstacle to mining operations. The seam has hardly any distinct inclination, and no matter in what direction a place is driven, a small hollow is liable to be encountered which always fills up with water. And water in a low bed is a great drawback. To cope with it, ditches are dug on all the main levels, by-levels, and sometimes in the rooms. In some instances, also the bottom coal and mud are left in place and only the top coal worked.

Boys and Men Push Cars

The ditches dug for drainage purposes are from 1 ft. to 3 ft. deep and are located in the middle of the roads. The ties are laid across them and boards are nailed to the ties so that a good road to walk on is provided. Of course no horses are employed in these mines. So far the cars have been pushed to and from the bottom of the shaft by boys and men. These cars hold 10 cwt., or 1,120 lb. of coal each.

The volume of water, encountered in these mines is not large but the way in which it spreads in the low workings makes it troublesome. Most of it is drained through the ditches, to a single-stage centrifugal pump, that delivers it to a surface stream. A 4-in. pipe is large enough to keep the water down. Open lights are used in all the mines of the region as inflammable gas has never been detected there.

A year ago one of the operating companies introduced coal cutting machines. These are of the chain type and at the present time four are in use, cutting being done in the so-called "mud," and on a long face. These machines have all they can do to cut at all, but as a rule they undermine from 200 to 250 ft. of face in one shift.



Miner's Dwelling at Minto

Minto has its housing problems as well as other mining communities. This illustration shows the type of houses that have been erected for the use of the miners. There is nothing fancy in the architecture or construction of this cottage, but it is, nevertheless, neat, comfortable and "homey."

The coal is shoveled from the floor into conveyors and by them moved along the face of the run to the car. As the roof is heavy and slippery it has to be supported in a perfectly systematic manner. A running boom or lid is set on 2-ft. props which hold it from 2 to 3 in. below the roof. The props are kept 4½ ft. back from the face of the coal to let the machine pass. One end of a strap 5 ft. long is laid on the lid, the other end being hitched on top of the coal. These straps are not over 2 ft. apart. As the machine moves along its cut gummers shovel the cuttings into the gob while timbermen gib or sprag the coal and set a running boom or "lid" under the straps. When the miners shoot the coal they timber as they shoot. Thus they put straps above the last lid set hitching them on top of the new coal face. No mistakes must be made in timbering. With such a roof in a low place frequently troubled with water from both roof and floor, it will be seen that conditions for machine mining are not of the best. So far, however, it has been a success.

The company using the electric undercutters owns an electric plant which furnishes power for the hoists and cutting machines and also lights the town and neighborhood of Minto. Two generators are installed, each capable of yielding 310 hp. at 1,100 volts. Two large boilers furnish steam to these machines and a third unit is now being installed. This will add materially to the capacity of the plant.

A Modern Mining Town in the Mountains of Kentucky

This town of Burdine is one of three model communities fostered by the Consolidation Coal Co., in Letcher County, Ky. Built only on one side of the B. & O. R.R. the heart of the village nestles in the valley, and on the picturesque hillside many employees of the coal company have their homes overlooking the little town and affording a bird's-eye view of the valley and the tipple on the opposite mountain side. A modern school building, churches, stores, recreation buildings and a baseball park in this beautiful setting help develop contentment in the lives of the employees of the Consolidation company.

Union Pacific Coal Co.'s Code of Standards—III*

Transformers and Transformer Vaults

1. All transformers shall be provided with an oil circuit breaker in the primary circuit, the frame of which shall be effectively grounded.

2. Transformer vaults are to be located between the intake airway and the return.

3. The construction of transformer vaults must conform in plan to Figs. 12-13.

Wiring of Surface Buildings and Tipples

1. All buildings shall be wired in metal conduits, special attention being given to neatness and the proper support and installation of fittings.

2. The voltage for such work shall be 250 volts or less.

3. Electric heaters in weigh rooms shall be stationary and connected to separate circuits from lighting circuits. They shall be protected with suitable guards to prevent inflammable material from coming within 8 in. of the heating elements.

4. Telephone and signal lines if liable to come in contact with high-voltage power lines shall, at the point where they enter any building, be protected with a Western Electric Co.'s Type 58 A.P. protector or its equivalent installed in a steel box which shall be properly grounded.

5. Motors in dusty places shall be installed in separate rooms which shall be made fire resistant by lining with metal lath coated with cement plaster.

6. Motor wiring shall be installed in metal conduit. Special attention shall be given to guarding exposed conductors and parts that may give electric shock.

7. Motor frames, starting compensators and control equipment shall be effectively grounded.

8. Starting compensators, controllers and switches containing oil, freezing of which will render the apparatus less effective, shall be filled with non-freezing oil.

9. All knife switches shall be of the safety inclosed type.

Overhead Distributing Lines

An overhead distributing line is taken to mean any circuit or aggregation of circuits on poles, including supporting elements, that are used for supplying electrical energy at a potential not exceeding 2,300 volts. It includes motor, lighting, signal, telephone circuits, etc.

1. Pole spacing shall be 100 ft. in streets and alleys.

2. Pole lines shall be inspected every year to determine condition of butts below the ground line.

3. All lines shall be inspected every two months to determine their general condition.

4. Cross-arms shall have a center-pin spacing of 30 in. and a side-pin spacing of 14½ in.

5. All wires of the same circuit shall be carried on the same cross-arm.

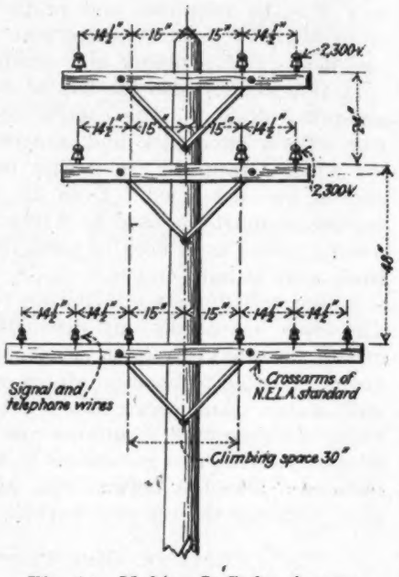


Fig. 14—Making It Safer Among the Wires

Climbing space is provided by setting all wires on the crossarms so that none comes closer than 15 in. to the center line of the pole. Thus a 30-in. clear space is always kept.

6. Vertical risers on poles from underground cables shall have a metallic sheath or be inclosed in a metal conduit.

7. Ground wires attached to the surface of a pole shall be protected by a wooden casing not less than 1½ in. thick and shall not make contact with cross-arm braces, guy fastenings or other exposed metal parts.

8. Guy wires shall have an interlocking strain insulator which shall be so located as to give 6 ft. of horizontal clearance from the pole guyed.

9. All poles to which guys are attached shall be protected with guy shims and guy hooks.

10. For climbing space on poles see Figs. 14 and 15.

11. Cross-arms carrying power wires of the same voltage shall have a vertical spacing of 24 in.

12. Cross-arms carrying signal and telephone wires shall have a vertical spacing not less than 48 in. from power lines.

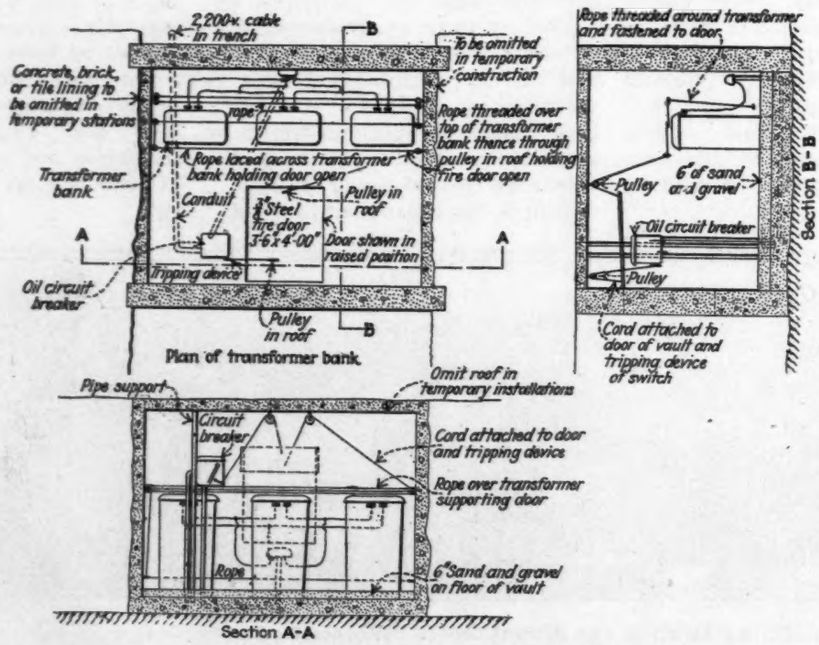
13. Material and minimum size of conductors shall be as follows:

2,300 volt lines, No. 6 B. & S. gage M.H.D. copper; 110/220 volt lines, No. 8 B. & S. gage M.H.D. copper. Signal and telephone lines, No. 12 B.W.G., EB.B. galvanized iron wire. Pole steps shall be ⅝x9 in. galvanized iron.

M.H.D.—Medium hard drawn.
B.W.G.—Birmingham wire gage.
E.B.B.—Extra best best.

Instructions to Persons Inspecting Electrical Equipment

1. Inspectors shall pay particular attention to ground connections and shall satisfy themselves, beyond doubt, that the ground wire will serve the purpose for which it is intended.


2,200v. cable in trench
Concrete, brick, or tile lining to be omitted in temporary stations
Transformer bank
Conduit
Oil circuit breaker
Tripping device
Pulley in roof
Rope laced across transformer bank holding door open
¼" Steel fire door 3'-6"x4'-0"
Door shown in raised position
To be omitted in temporary construction
Rope threaded over top of transformer bank thence through pulley in roof holding fire door open
Plan of transformer bank.
Rope threaded around transformer and fastened to door
Pulley
6" of sand and gravel
Oil circuit breaker
Cord attached to door of vault and tripping device of switch
Section B-B
Pipe support
Omit roof in temporary installations
Circuit breaker
Cord attached to door and tripping device
Rope over transformer supporting door
Rope
6" Sand and gravel on floor of vault
Section A-A

Figs. 12-13—Transformers Are Isolated If a Fire Starts

Besides being inclosed in a vault all transformers used in the mines are set up between the intake and return airways. Rope made of combustible material is threaded around the transformers and normally holds a ventilating door in the vault open. Should a fire occur in the vault the rope will burn and thus permit the door to shut thus confining the blaze and opening the circuit breaker.

*This is the third of a series of articles giving the Code of Standards put into effect by the Union Pacific Coal Co., at its operations in Wyoming. The first two articles appeared in the issues of Dec. 10 and 17 and the remainder of the code will be published in future issues in this form that permits of easy filing.

2. Concealed ground wires shall be replaced by others that are visible throughout their entire lengths where possible.

(Note: Parts that should be grounded are: Cable sheaths, conduits, oil switches and operating levers, transformer cases, motor frames, compensator and motor starting apparatus, metal boxes containing switches, resistors or control equipment, secondary circuits from transformers, controllers, pipe frames supporting switch boards and other equipment.)

3. Observe that ground wires from direct-current generators are properly connected to both rails of the track.

4. Wires leading to motors or generators shall be properly guarded.

5. Oil switches and compensators shall be examined for proper oil condition and for accumulations of coal dust.

6. Inspect wires and cables that cross passageways and hoisting slopes, as these may become loose and present a great hazard. Light, telephone or signal wires across slopes may endanger persons on man trips.

7. Determine that overload relays, automatic circuit breakers and undervoltage releases function properly.

8. Synchronous motors are operated with a fixed amount of exciting current at no load. See that the field adustments are correct and that instruments indicate properly.

9. Direct-current generators lose voltage upon becoming warm. See that someone adjusts voltage during the working shift.

10. Familiarize yourself with the operation of all pumps, motor-generator sets and hoists in order to determine that all starting, stopping, controlling and protecting equipment functions properly.

11. Low voltage at any working place or any extra load that is to be added to installed equipment, is to be reported at once to the mine foreman in charge.

12. Report all equipment overloaded, abused, or poorly ventilated causing overheating.

13. Inspect electrical equipment when not in operation to determine condition of bearings, brushes, commutator and collector rings, and observe condition of revolving parts for air gap clearances loose band wires and dust accumulations.

14. Inspect mining machine cables for bruised places and splices and see that they are adequately insulated and completely protected with rubber and friction tape.

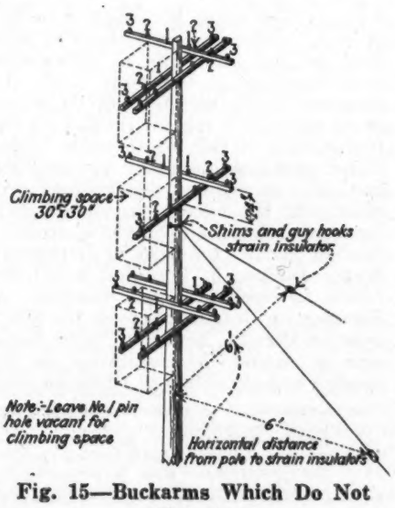

Climbing space 30"x30"
Shims and guy hooks strain insulator
Note:-Leave No.1 pin hole vacant for climbing space
6'
Horizontal distance from pole to strain insulators

Fig. 15—Buckarms Which Do Not Obstruct

There is no need for the lineman to wind around the pole to get to the uppermost wires when buckarm construction like this is maintained. Note how the 30x30-in. climbing space is mainttined on one side of the pole.

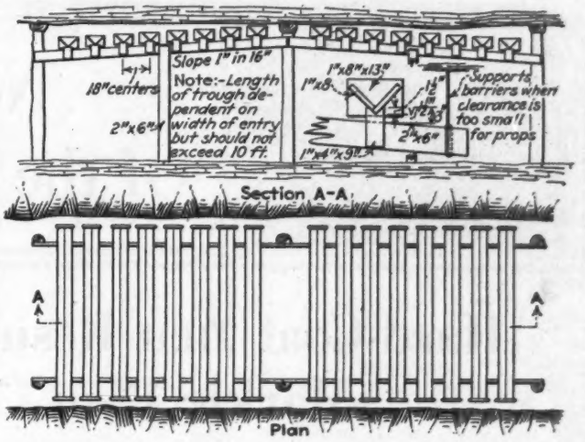


FIG. 16
Dust Barriers Stop Blasts

Troughs filled with dust which not only falls on the surrounding floor and ribs but will hang in suspension, stop and localize explosions. The arrangement of these troughs varies; when the clearance in the gangway is limited they are hung from the roof on eye bolts as shown in the illustration.

Safety Standards

1. Smoking or the carrying of any smoking or flame producing materials is prohibited in all mines operated on a closed-light basis.

Sec. 4,439, Wyoming Compiled Statutes.—"Any miner, workman or other person who shall . . . carry any pipe, cigar or cigarette, match or fire-producing material or appliance into places that are worked by safety lamps . . . shall be deemed guilty of a misdemeanor and may be punished in a manner provided in Sec. 4,451 which provides a fine of not less than $200 and not more than $500 at the discretion of the court."

Sec. 4,436, Wyoming, Compiled Statutes.—"Any man working in a mine or mines where safety lamps or electric lamps are used exclusively, shall be subject to search by the mine foreman or his assistants for matches or . . . inflammable materials. No person shall have in his possession in any part of the mine where locked safety lamps are used, any matches or means of producing fire, or any lamp key or instrument for the opening of a locked safety lamp. Any person or corporation violating any of the provisions of this section shall be guilty of a misdemeanor and subject to a fine not to exceed $200."

2. Any miner or other workman who is habitually found working in dangerous places due to his laxity in properly timbering or otherwise making himself safe subjects himself to immediate discharge.

3. All persons entering the mine must be checked in and out of the same, and every person while underground must have his life check on his person and in his right hand front trousers pocket.

4. No machinery of any kind will be allowed to operate unless all gears and other dangerous parts are fully guarded.

5. All mines shall be protected against the propagation of an explosion by rock-dust barriers. These barriers shall conform in plan and general construction and arrangement to Fig. 16.

(NOTE: In places where sufficient clearance is untainable or where it is deemed impractical to support dust barriers by props, they may be suspended from the roof by proper eye bolts. Where barriers are set into the roof, vanes shall be placed on either side of same to deflect the air currents into them.)

6. Dust barriers shall be located on all slopes, air courses, and manways intermediate of all cross entries as shown in Fig. 17.

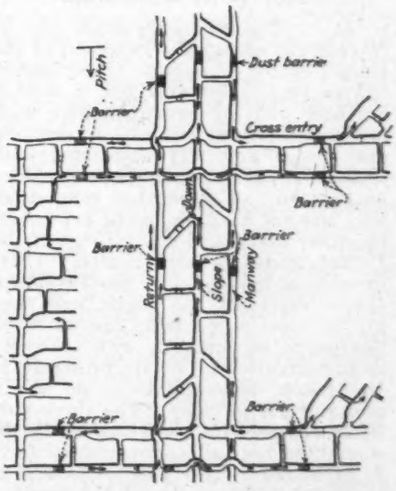
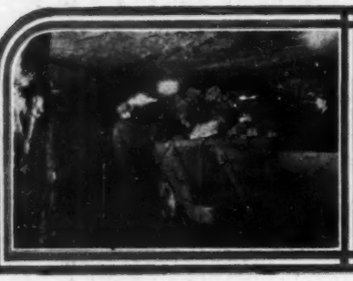


Fig. 17—Blockades Against Explosions

Complete sectionalization is attained by dust barriers on slopes, manways, returns and cross entries, as illustrated. Whatever explosions occur the aim should be to completely isolate them and minimize all danger to adjoining sections.



News Of the Industry

Hard-Coal Men Resume Peace Negotiations; Markle Plan Center of Interest

A new plan to insure permanent peace in the anthracite region is now under consideration by operators and miners. The plan, drafted by Alvan Markle, chairman of the joint conference, was submitted to the sub-committee of miners and operators, which resumed negotiations at a meeting which started at the Union League Club, New York, on Tuesday afternoon.

The plan, in full, reads as follows:

"(1) The terms and provisions of the award of the Anthracite Coal Strike Commission and subsequent agreements made in modification thereof, or supplemental thereto, as well as the meetings and decisions of the Board of Conciliation, are to be ratified, confirmed, approved and continued until the first day of September, 1935, subject to renewal every ten years thereafter, except as hereinafter modified.

"(2) The contract and working conditions which were operative on Aug. 31, 1925, are to be extended to and including Aug. 31, 1926.

"(3) Immediately, or as soon as possible, a fact-finding committee, consisting of three miners (or representatives) and three operators (or representatives), shall be appointed by the respective parties.

Public to Be Represented

"(4-A) The committee shall join in respectfully asking the President of the United States to appoint three impartial citizens, preferably one a mining engineer and geologist, familiar with mining conditions and coal production, but not in any way associated with anthracite coal mining properties, one an economist of established reputation, who has not been employed heretofore by either party, and one a Judge of the United States federal courts. These three men, appointed by the President, are to represent the public, and they are to select a reputable firm of certified public accountants, with authority to investigate and report promptly to the public representatives on every phase of the industry. The three public representatives shall meet with the committee, hear all arguments and facts as presented by both parties, as well as to consider the report of the certified public accountants. They (the public representatives) shall meet separately, prepare a report and submit their recommendations to the President of the United States and joint committee of miners and operators.

"(B) The committee then shall meet as a whole to reach an agreement as to wages and any change in the contract requested by either party, it being understood that the public representatives may enter into all discussions but shall not have a vote except in the following instance:

"If, after the submission of the report of the public representatives named by the President, the miners and operators shall fail to reach an agreement upon any disputed point or points within sixty days after such submission, then in such event the public representatives shall each be entitled to cast a vote upon such disputed question or questions, with the representatives of miners and operators, and a majority of the nine members shall decide the same.

Committee to Meet Annually

"(5) On the first Wednesday of June, 1926, and the first Wednesday of June in each succeeding year, the joint committee of three representatives of the anthracite miners, the three representatives of the anthracite operators, and the three representatives appointed by the President to represent the public, shall meet at the request of either party, to adjust wages and conditions for the year beginning on the following first day of September, as herein provided in Paragraphs 4-A and 4-B.

"(6) The wage rates determined by the committee shall be for a period of one year, beginning upon Sept. 1, and if the committee is delayed in fixing rates through causes unforeseen beyond their control until after Sept. 1 in any year, there shall be no lockout or strike, and the decision when rendered shall be retroactive as of Sept. 1 of such given year.

"(7) The joint committee shall elect a chairman and secretary, with the right to join in discussions, but without power to vote, and the chairman shall have power to convene said committee at his discretion.

"(8) Rules and regulations for the conduct of meetings, as well as place for same, shall be agreed upon by the joint committee at the first meeting.

"(9) In case of death or disability or resignation of any appointee, the vacancy thus caused shall be filled by the party which named the appointee in the first instance.

"(10) The expenses of the committee shall be divided equally between the miners and operators."

At the opening of the conference the various other plans recently proposed were placed in the record. When the Markle program was laid before the meeting, opposition was voiced by the miners on the ground that the plan meant arbitration. The operators, on their side, reiterated the necessity for a settlement which would end periodic suspensions. Particular emphasis was placed upon the provisions of paragraphs 4-A and B. The chairman explained that these provisions were inserted to provide strict impartiality.

The miners wanted to know whether freight rates and selling prices would come in the scope of the Markle program. The reply was made that the fact-finding committee set up could not go outside the terms of the wage contract. The operators argued that any decision fixing prices would be illegal. The miners retorted that it was not fair to arbitrate wages and not prices.

The committee continued in session until nearly midnight and then adjourned until yesterday afternoon. Neither side would make any predictions as to the outcome.

Attempt Conference at Scranton

For a few hours last week it looked as if the conference reconvened at New York on Dec. 29 would be anticipated by a meeting at Scranton under the auspices of the mayors and burgesses of the anthracite region. Following the Inglis letter of Dec. 20, in which it was stated that the operators accepted the invitation to resume negotiations provided that the miners abandoned their reported insistence upon the discredited Pinchot plan as the basis of settlement, Mayor Durkan of Scranton wired Mr. Lewis to meet with the operators at Scranton on Dec. 22. Late on the afternoon of Dec. 21, however, Major Inglis sent a second communication to the mayors and burgesses in which he said:

It is necessary, to make our position perfectly plain, to remind you that the resolution under which your invitation to a meeting was authorized and issued specified that the conference was to be on "the understanding that either side shall be at liberty to bring up for discussion its own plan or plans, the Governor's plan or any other plan that may be offered."

Mr. Lewis's response to your invitation stated that "if the mine workers enter a conference it will be upon the basis of the Governor's compromise."

Our response to your invitation stated that we would attend the conference with-

Real Earnings of Contract Miners In Anthracite Fields—III

(MADEIRA, HILL & CO.)

Are contract miners in the anthracite fields underpaid?

John L. Lewis, international president of the United Mine Workers, insists that they are. He has repeatedly drawn upon the reports of the Coal Commission, with their misleading figures basing earnings upon the number of starts made, to support his assertion. In a statement published in the Sept. 15 issue of the *United Mine Workers' Journal*, Mr. Lewis declared that the average was $1,700 per year, from which "there must be deducted over $200" for supplies.

Check of actual payrolls, however, tells a far different story.

The collieries of the anthracite operations of Madeira, Hill & Co. made 284 breaker starts in 1924 and employed 1,047 contract miners. Of this number, however, only 439, or 42 per cent, worked regularly enough to appear on each of the semi-monthly payrolls. Of this number, 51 men averaged over $4,000 *net* for their labors. The lowest rated group averaged $1,276.71.

The average earnings by $100 groups for the 439 contract miners were as follows:

Miners	Average Annual Earnings	Miners	Average Annual Earnings
51.....	$4,004.98	32.....	$2,355.11
5.....	3,455.91	40.....	2,253.74
6.....	3,345.50	27.....	2,160.11
11.....	3,245.80	21.....	2,055.64
19.....	3,142.65	18.....	1,954.41
17.....	3,046.83	20.....	1,859.52
14.....	2,945.31	16.....	1,749.97
14.....	2,857.49	9.....	1,671.44
17.....	2,742.36	6.....	1,549.09
25.....	2,645.61	5.....	1,459.11
24.....	2,542.97	2.....	1,362.83
37.....	2,454.41	3.....	1,276.71

The average earnings for the entire group of 439 were $2,597.32. Forty-six per cent of the group made more than $2,500. Eighteen per cent fell below $2,000; men in this division worked less than 258 days and the lowest rated groups averaged 239 days. Average daily earnings ranged between $6.05 and $14.17 for an average day of approximately 6½ hours.

out any conditions whatever provided that the miners accepted your invitation in the same sense and without reservation. The miners have failed to do this.

Until you can give us written assurance from the miners that they are willing to enter conference on the basis of your invitation and without any reservation, we regret to say that we cannot attend the meeting suggested. Such a meeting would lead to nothing except misunderstanding and further delay. It is because we are most anxious that our attitude should be thoroughly understood that we have given in detail the reasons on which this reply to you is based.

Lewis "Misunderstood"

Following the receipt of this letter, Mayor Durkan wired Mr. Lewis that the conference was off. Still later Mr. Lewis wired from his home in Springfield, Ill., that his position had been misunderstood. "Governor Pinchot," he said, "has urged that I clarify the wrong impression of the mine workers' attitude which has been brought about by improper interpretations. Accordingly you are advised that while the mine workers will enter the conference in the light of your invitation and in conformity with our telegrams to your committee, the presentation and advocacy of the Governor's plan does not prevent the consideration of any other plan or plans by the parties to the conference."

Before this telegram was made public, however, a bombshell was thrown into the miners' camp by the appearance of an appeal signed by sixteen Catholic clergymen, who said they represented "in a pastoral capacity 85 per cent of the miners of anthracite coal," declaring that the miners were tired of the suspension and wanted arbitration of all disputed points upon which the operators and the union were unable to reach an agreement. Failure of the operators and miners to get together, asserted the clergymen, had resulted in the irreparable loss of millions of dollars to employers and employees and to the public, a national prejudice against anthracite, loss of faith in the future of the anthracite region, danger to the health and lives of the workers and their families and a state of idleness producing a demoralized citizenry.

District leaders of the union displayed restrained resentment over the action of the priests, but in other quarters the statement was accepted generally as a true picture of conditions. The position taken by the pastors was indorsed the next day by eleven pastors of English-speaking congregations.

Shortly before midnight Christmas Eve, Alvan Markle, chairman of the joint conference, announced that a call had been issued for a meeting at New York on Dec. 29. Two days later full-page advertisements began to appear in the papers in the region offering to reopen the mines at once at the old wages and to continue that scale until next September.

More Ships Switch to Coal

The U. S. Emergency Fleet Corporation will place additional coal-burning ships on its Oriole Line to United Kingdom ports, displacing oil burners. Arrangements to this effect are now in progress, according to statement last week by James F. Paige, assistant to the vice-president in charge of operations. This decision is due, it is understood, to the substantial savings effected by the substitution, several months ago, of four coal burners for oil burners. It is estimated that the entire cost of placing these four coal burners in spot condition will be recovered in less than 18 months through fuel savings. The reconditioned ships were part of what is known as the "laid-up" fleet.

$6,000,000 Merger Plans 20,000,000 Ton Output

A consolidation of coal and dock properties that handled twelve million tons of coal this year was announced at Cleveland, Dec. 29, by Frank E. Taplin. It is the North American Coal Corporation, a holding and sales company whose incorporation papers were filed on Dec. 30. The new concern is capitalized at $6,000,000. It was said that three more companies were to come in early in 1926 to raise the output to twenty million tons.

Mr. Taplin's Cleveland & Western Coal Co. forms the nucleus of the North American Coal Corporation. The others included are the Powhatan Mining Co., the Pittsburgh Terminal Coal Co., the Standard Island Creek Coal Co. and three dock operating companies, the Inland Coal & Dock Co., of Duluth, the United Coal & Dock Co., of Milwaukee, and the Canada Coal Co., Ltd. The North American will be the selling agent also for W. C. Atwater & Co., of New York. The officers of the corporation are Mr. Taplin, president; William Taylor, of Cleveland, A. S. McQueen and C. E. Tuttle, of Pittsburgh, vice-presidents.

Byproduct Coke Production Breaks Record in November

Output of byproduct coke in November, 1925, according to the Bureau of Mines, was 3,557,000 net tons, which is the highest on record, being an increase of 155,000 tons, or 4.6 per cent, compared with October. The coke plants operated at about 88 per cent of capacity. Including the new plant at Troy, N.Y., and the rebuilt plant at Chester, Pa., the number of byproduct plants in existence now totals 80, of which 74 were active during November.

Of the total production of byproduct coke during November, 2,953,000 tons, or 83 per cent, was made in plants associated with blast furnaces, and 604,000 tons, or 17 per cent, at merchant or other plants.

Beehive coke output in November totaled 1,213,000 net tons, an increase of 207,000 tons, or 20.6 per cent, compared with October. Byproduct plants contributed 75 per cent of the output of all coke in November.

Eastman New I. C. C. Chairman

J. B. Eastman will become chairman of the Interstate Commerce Commission Jan. 1, under the rule of rotation by which the position is filled from among the commission members. Mr. Eastman, formerly a member of the Massachusetts Public Service Commission, was appointed to the federal body by former President Wilson.

"Soo" Coal Traffic Lower

During the lake shipping season of 1925 11,974,347 net tons of bituminous coal and 899,989 tons of anthracite passed through the "Soo" Canals. This was a decline of 1 per cent in soft coal and of 37 per cent in hard coal as compared with 1924, when the totals were 12,126,252 tons and 1,439,701 tons.

Reign of Terror Marks Christmas Observance In W. Va. Strike Zone

A reign of terror broke out in the northern West Virginia coal fields last week, which culminated in an unsuccessful attempt to destroy the steel girder bridge of the Western Maryland Ry. that spans the West Fork River at Bingamon, Marion County, at 4:30 a.m. Dec. 23. Nitroglycerine, police believe, was used to blow up the shoes on the bridge, with the result that the main span sagged to the middle pier of the bridge, which is 300 ft. long. The extent of the damage will not be known until the company engineers of Cumberland, Md., make an inspection of the damaged structure. Effort is being made by the railroad officials to make the necessary repairs to the bridge by early this week. Western Maryland detectives, state police and county authorities are at work on the case. No coal cars can be moved until repairs are made, but with the ease-up over the holidays there will be no serious tie-up. The Carolina mine of the Consolidation Coal Co. on the Helen's Run branch is in a position to work, this branch coming on to the Monongahela River branch of the Baltimore & Ohio at Chieftown.

A charge of dynamite is believed to have been hurled from a passing automobile under the house of Andrew Pawiski in Monongah on Monday night, Dec. 21, when a portion of the structure was blown away. The house is owned by the Consolidation Coal Co., and it is reported that Pawiski was previously threatened. Pawiski, who is a Polish miner, was among the first foreigners to work there, and it is thought that the demonstration was against any Poles breaking the strike there.

Dynamite on Christmas Day

A third dynamiting incident occurred early Christmas morning when an attempt was made to destroy the home of John Bondo, a merchant of Monongah, who is working open-shop in the Monongah mine of the Consolidation Coal Co. Only windows in the home were shattered. The bomb was thrown from a passing automobile.

Fire of unknown origin destroyed a vacant double house of the Consolidation Coal Co. at Baxter early Sunday morning, Dec. 20. A loss of $4,000 was sustained. The Fairmont fire department responded and kept the flames from spreading to other buildings in the mining town.

Twenty thousand children in the 12½ counties of northern West Virginia were treated to candy, apples, oranges and nuts by the United Mine Workers on Christmas Day. Similar depots were opened in Grafton, Clarksburg, Morgantown and Tunnelton. Entertainments were held by many of the local unions and Christmas trees in many instances were trimmed in the barracks, including Grant Town, Dakota, Baxter, Barrackville, and other places. Addresses were made by international representatives at all of the Christmas gatherings. One of the largest attended gatherings was in the miners' hall at Monongah, where the union Sunday schools rendered Christmas carols on the evening of Dec. 23.

Because of the holidays the coal production will suffer for the next week or more. Most of the coal mines closed down at the end of Wednesday and planned to resume Monday, Dec. 28. The lack of demand for coal, heavy accumulations and the trade facing the inventory season of railroads and industries, will curtail output.

In the first two days of last week 4,008 cars of coal was produced by non-union mines compared to 610 cars by union mines. There were 234 non-union mines at work Dec. 21, when they produced 2,001 cars of coal, while on Dec. 22 225 mines were active, and they loaded 2,007 cars of coal. Fifteen union mines worked both days, and on Dec. 21 produced 313 cars of coal and on Dec. 22, 297 cars.

The production while heavy during the beginning of the week slumped toward the week-end. In the first two days of the previous week the non-union mines loaded 3,862 cars of coal, while union mines produced 448 carloads. During that week 255 non-union mines were at work daily on the average and 14 union plants operated.

The Tidewater Power Co., Raleigh, N. C., and Southern Power Co., Charlotte, N. C., will ask for offers on an aggregate of about 300,000 tons of coal, mostly slack, for delivery in the near future. These companies have found themselves in need of coal for their auxiliary power systems, because of the extended drought of last summer and the consequent lack of proper water supply for their hydro-electric systems.

Plan Co-operative Selling In Western Kentucky

Preliminary steps for the formation of a centralized sales organization for western Kentucky operators were discussed at a conference of about twenty-five producers from that field, held in Louisville, Dec. 16. A committee was named to study the matter and decide on the feasibility of the plan, after analyzing the legal technicalities surrounding it. Tentative arrangements were made for another meeting at an early date to continue the discussion.

Aaron Sapiro, who organized California and other Western fruit and vegetable co-operatives, the tobacco growers, cotton producers, potato shippers and others, outlined co-operative sales methods.

The plan, of course, is to terminate as much as possible the present policy of "loose selling." Any organization that may be formed will be separate from any existing body.

For two years or more western Kentucky operators have been discussing various merger proposals, none of which has been worked out satisfactorily yet.

Changes in Mines Committees In Both Houses

The membership of the Senate Committee on Mines and Mining for the Sixty-ninth Congress is made up as follows: Tasker L. Oddie, of Nevada, chairman; Thomas J. Walsh, of Montana; Coleman duPont, of Delaware; Henry F. Ashurst, of Arizona; Key Pittman, of Nevada; Guy D. Goff, of West Virginia; William H. King, of Utah; Lynn J. Frazier, of North Dakota; Robert M. LaFollette, of Wisconsin; Arthur R. Robinson, of Indiana. Ralph H. Cameron, of Arizona, has been transferred from the committee to a vacancy on the Appropriations Committee. Rice M. Means, of Colorado, also has retired from the committee to accept a place on the Committee on Public Lands.

The membership of the Committee on Mines and Mining of the House of Representatives is as follows: John M. Robsion, of Kentucky, chairman; Arthur H. Greenwood, of Indiana; William Williamson, of South Dakota; Mell G. Underwood, of Ohio; Don B. Colton, of Utah; Joseph Whitehead, of Virginia; Charles E. Winter, of Wyoming; Andrew L. Somers, of New York; W. H. Sproul, of Kansas; Butler B. Hare, of South Carolina; George F. Brumm, of Pennsylvania; Virgil Chapman, of Kentucky; J. J. Manlove, of Missouri; Arthur M. Free, of California; Edmund M. Carpenter, of Pennsylvania, and Dan A. Sutherland, of Alaska.

Senator La Follette Seeks Hard-Coal Company Data

A resolution providing "that the Secretary of the Treasury be and he is hereby authorized and directed to furnish to the Senate a statement based on corporation income tax returns covering the year 1924, showing for each corporation engaged in the mining of anthracite coal the amount of capital stock, the amount of invested capital, the amount of net income, the amount charged to depreciation and depletion account and the amount of federal tax paid by each such corporation," was presented in the Senate at Washington Dec. 22 by Senator LaFollette. Upon objection of Senator Reed, Pennsylvania, the formal introduction of the resolution goes over, according to the regular Senate rule, until the next calendar day, which in this instance is Jan. 4. It will be noted that this resolution does not call for action by the House of Representatives.

Massachusetts Dealers Have Coal for About a Month

Retail coal dealers in Massachusetts reported stocks of 178 000 net tons of domestic anthracite, 333,474 tons of bituminous coal and 34,127 tons of coke in their yards on Dec. 1. During November the dealers delivered about 187,000 tons of anthracite, 220,000 tons of bituminous coal and 28,000 tons of coke. The cumulative deliveries of anthracite by dealers in the first eight months of the coal year total 3,528,558 tons, which is about 69 per cent of the total deliveries in the last coal year.

To Push Legislation on Hard Coal in Congress Even if Strike Ends Soon

By Paul Wooton

Washington Correspondent of *Coal Age*

Appeals in the Senate and in the House of Representatives for the consideration of coal legislation thus far have failed to elicit any promise or commitment from the chairmen of the committees having jurisdiction. Some idea, however, of the views of Representative Parker, chairman of the House Committee on Interstate and Foreign Commerce, has been obtained. Representative Treadway of Massachusetts, in the course of remarks on the floor of the House, said the public is being left out of the equation by the operators and miners, whom he held to be equally responsible for the present situation.

This led Chairman Parker, whose committee must take the first step in any legislation that has been proposed, to ask if thought had been given to the fact that anthracite is mined within the borders of a single state and that it is a matter which must be handled largely by that state.

When Representative Treadway declared that the Girard "trust" is taking the money for its "so-called" charities from the anthracite consumers, largely in states other than Pennsylvania, Mr. Parker again asked his significant question: "Will the gentleman point out how we can remedy that situation?" This brought from Mr. Treadway the admission that he simply was bringing that situation to the attention of the public. He added that he would bring under regulation that part of the anthracite production which enters into interstate commerce.

Seeks Legislative Protection

Mr. Treadway commended strongly to members the recommendations of the Harding Coal Commission that anthracite be declared a public necessity and that full publicity be given the items making up the cost to the consumer. He made it clear that he will strive for legislation, even if the present strike should be settled in the near future, so that New England and other anthracite consuming states will know "whether they must learn to do without anthracite or, as an alternative, whether they can be protected so as to expect a continuous supply and at a price which they know to be fair and proper."

Congress was urged by the New England Representative to take action that may result in "freedom from the octopus of Pennsylvania greed, and when I say Pennsylvania greed, I refer to the state itself, exactly as much as I do to the operators and miners." If the state wants to show good faith, Mr. Treadway feels, it should repeal its export tax and its miners' licensing law and use its great power to change its royalty system.

In the Senate, Mr. Copeland, of New York, made an oratorical effort on behalf of those who are suffering as a result of the strike. He urged Congress to act in their behalf, but failed to suggest the form such action should take.

As this is written, Senator Oddie is awaiting Secretary Hoover's report on his Bureau of Coal Economics bill. With that report in hand, which may suggest extensive changes in the bill, it is Senator Oddie's intention to start public hearings.

In the meantime, much light is thrown on the condition of the country by the report on stocks issued by the Bureau of Mines, shown on another page.

George J. Young

Mr. Young, who for the past five years has been associate editor for *Engineering & Mining Journal-Press* with headquarters at San Francisco, will also serve in the future as Pacific Coast editor of *Coal Age*. Mr. Young is one of the authorities on mining engineering and mining methods, especially through his book on "Elements of Mining," which is published by the McGraw-Hill Book Co. It is considered the best work of reference on the subject. A volume by Mr. Young on "Underground Mining Methods" is now being published by Ernest Benn, Ltd., in London, the British publishers having especially requested Mr. Young to undertake this volume. Arrangements also have been made to publish it in the United States through the McGraw-Hill Book Co. Mr. Young is a graduate of the University of California, and in the course of his career has served as professor of mining at the Mackay School of Mines in Nevada and the University of Minnesota and as professor of metallurgy at the Colorado School of Mines.

Consumers Company Floats Big Bond Issue

The Consumers Co., Chicago's largest retail coal concern, has sold to Halsey, Stuart & Co. $8,500,000 in securities, consisting of $6,000,000 first mortgage sinking fund 6 per cent bonds, due Jan. 1, 1946, and $2,500,000 6 per cent convertible gold notes, due Jan. 1, 1931, which are to be issued to the public soon. The financing is in accordance with plans decided when a reorganization of the financial structure of the company was effected, about six weeks ago. At that time Stuyvesant Peabody was elected president. The significance of this step was explained when it was stated that the Consumers Co. hereafter will be under the management of the Peabody Coal Co., of which Mr. Peabody is also president.

Pittsburgh Coal Co. Soon To Reopen Sixth Mine In Smoky City District

The Pittsburgh Coal Co., it is reported on reliable authority, will reopen another mine in the Pittsburgh district on the 1917 scale within a week or so. This will give the company a total of six mines working on the 1917 scale in the Pittsburgh district. While the exact location of the new mine is not revealed it probably will be in Allegheny County, adjacent to the City of Pittsburgh, in which county the company already has two mines working.

The opening of the sixth mine, preparations for which are said to have been completed, is the result of the successful period of operation at the other pits of the company in this district. During the last few weeks the Pittsburgh Coal Co. has been averaging from the five operations in the neighborhood of 20,000 tons of coal per week, for which a ready market is obtainable, and the reopening of the additional operation will be in pursuance of the company's policy to gradually expand its operations until as many of the mines in western Pennsylvania are producing as it is possible to keep going.

In general, the actions of District No. 5, United Mine Workers, during the past few months have been passive in respect to the lower wage rate paid by the Pittsburgh company, but during the past week a number of reports have been current that some campaign toward the re-establishment of the Jacksonville agreement was being fomented in the union ranks.

On Dec. 24 the Pittsburgh Coal Co. distributed at its five mines the largest payroll since the resumption of operations on the 1917 scale. The total was $72,535.36, which with the distribution $60,043.37 to the miners on Dec. 12 makes a total of $132,578.73 paid in December. Midland mine, near Canonsburg, paid out the biggest sum distributed in any one of the company mines on Thursday, the Christmas pay there being $20,972.05. The average number of men participating was 274. Banning No. 2 mine, near West Newton, came next with $20,110.68 to an average of 257 miners. The payroll at Banning No. 1 was $16,996.90 to an average of 238 men and at Montour No. 10, at Library, $14,447.73 was paid to an average of 207 men. The pay at Mansfield was small due to the limited force of men there.

1,000 Gondolas for L. & N.

An order for 1,000 all steel drop-bottom coal cars of the gondola type was recently placed by the Louisville & Nashville R.R. with the Pressed Steel Car Co., Pittsburgh, at a cost of $1,800,000, it was announced at the office of the president of the road, at Louisville, Ky. The cars are to be delivered in March and April. This expenditure brings the total for new equipment, including passenger and freight cars and locomotives, ordered by the railroad within the last three months to $8,700,000, according to the announcement.

Consumers' Stocks of Bituminous Coal Total 48,000,000 Tons Nov. 1; Output Fails to Offset Anthracite Deficiency

Stocks of bituminous coal in the hands of consumers on Nov. 1 totaled about 48,000,000 net tons, according to a survey by the U. S. Bureau of Mines. This was slightly larger than in the corresponding period of 1924. On June 1, 1925, stocks were 38,000,000 tons. Between June 1 and Sept. 1, consumers added 5,000,000 tons to their total reserves, and between Sept. 1 and Nov. 1, another 5,000,000 tons. From the trend of production and consumption it is apparent that the flow of coal into storage has continued since Nov. 1.

At the rate of consumption prevailing in September and October, when busiwas active and consumption large, the stocks on Nov. 1 were sufficient to last 35 days. This compares with a supply of 45 days on Sept. 1, 1924, when business was dull; 46 days on Sept. 1, 1923, and 23 days on Nov. 1, 1922. These figures, of course, presuppose that stocks are equally divided, which never is the case.

In addition to the storage piles of consumers on Nov. 1, there were 7,512,000 tons of bituminous coal on the docks of Lakes Superior and Michigan, at least 221,000 tons held in storage by producers at the mines or intermediate points, and 503,850 tons in railroad cars unbilled at the mines.

Anthracite.—On Sept. 1, when the anthracite strike began, retail dealers had on hand a supply sufficient to last 53 days, at the rate they were delivering to their customers in September and October. By Nov. 1, retail stocks of anthracite had been reduced to 27 days.

A group of 21 byproduct coke plants, selling domestic coke, available as substitute for anthracite, reported 599,000 tons of coke in stock on Nov. 1.

The estimate of soft-coal stocks is based on practically complete reports from the byproduct coke works, steel plants, and railroads, and on reports from a selected list of other consumers —about 5,000 in all. The estimate takes no account of coal in the bins of householders, concerning which no statistics are available, nor steamship fuel, nor the tonnage on the Lake docks, which latter item is included under "Coal in transit."

As shown in Fig. 1, the total stock on Nov. 1 was slightly higher than on Sept. 1 of last year, the nearest comparable record in 1924. It was about equal to the level of stocks in the fall of 1921, much above that in 1922, after the great strike of that year, and much less than that of late 1923, when consumers were laying in reserves in fear of another strike.

The average rate of consumption plus exports for the two months of September and October was 10,500,000 tons of bituminous coal per week. This high rate indicates activity among the coal-using industries and also a considerable substitution of bituminous coal for anthracite.

Charts Show Large Stocks

In studying the figures of days' supply by classes of consumers, shown in Fig. 2, it should be borne in mind that they are averages and fail to show the great variation between different plants and even different communities.

Fig. 3 shows how the reserves of soft coal in terms of days' supply varied from state to state on Nov 1. For this purpose the general industrial plants, other than steel and byproduct coke works, give the best indication, because they form both the largest group of consumers and the one most responsive to changes in the coal market. New England was heavily stocked with coal, every state showing over 90 days, the average for the region as a whole being 110 days. Stocks in the northern peninsula of Michigan likewise were very large. In New York State stocks averaged 78 days, in lower Michigan 63 days, in New Jersey 59 days. All other states show reserves for less than 60 days' supply.

Public utilities, as usual, carried heavier reserves than any other class of consumers. The supply at coal-gas plants on Nov. 1 was sufficient, on the average, for 78 days, and at electric central stations, for 46 days.

Complete returns from manufacturers of byproduct coke and steel indicate the following reserves:

Byproduct Coke Plants

	Days' Supply		
	Sept. 1, 1924	Sept. 1, 1925	Nov. 1, 1925
Low volatile	33	18	28
High volatile	29	23	26
Average...	30	22	26

Steel Plants

	Days' Supply		
	Sept. 1, 1924	Sept. 1, 1925	Nov. 1, 1925
Steam coal..	36	30	31
Gas coal....	56	33	33
Average...	42	30	32

Each group had a larger tonnage in stock on Nov. 1, 1925, than on Sept. 1, 1924.

The total quantity of railroad fuel on hand Nov. 1, according to the American Railway Association, was 10,600,000 tons, a supply sufficient to last 30 days.

All coal brought to the surface and not yet delivered to a retail dealer or a consumer may be considered in transit. The largest element in this mobile reserve is the coal in railroad cars, which, though it has never been accurately measured, is known to run into millions of tons and to be subject to sudden and wide fluctuations. Because of the heavy production in late October, the quantity of bituminous coal on wheels on Nov. 1 probably was two million tons greater than on Sept. 1 and eight million tons greater tran on June 1.

Storage at the mines is practiced by few producers and the quantity so stored at present is small. From a list of 43 companies who have at some time stored in quantity at the mines or at some intermediate point, the Bureau

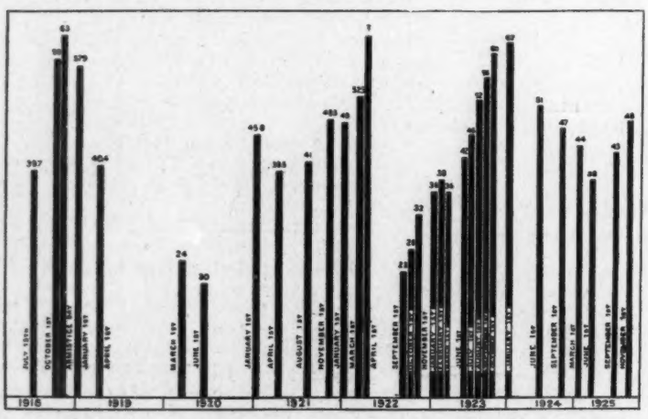


Fig. 1—Total Commercial Stocks of Bituminous Coal, Oct. 1, 1916-Nov. 1, 1925

Figures represent million net tons and include coal in the hands of railroads, industrial consumers, public utilities and retail dealers. Coal for steamship fuel, on Lake Docks, in transit and in the bins of householders is not included. From June 1 to Nov. 1 stocks increased about ten million tons, bringing the total back to the level of September, 1924. Reports are to the effect that since Nov. 1 further additions to stocks have been made.

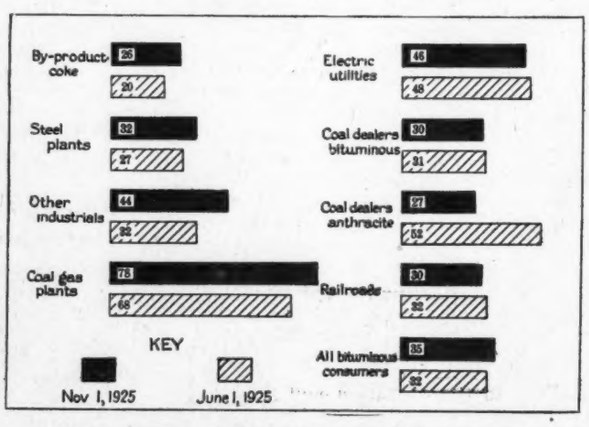


Fig. 2—Days' Supply Held by Different Classes of Consumers June 1, 1925, and Nov. 1, 1925

At the same time that the stocks of bituminous coal measured in tons were increasing, the rate of consumption also was increasing, so that measured in days' supply the reserve on Nov. 1, 1925, was not much greater than on June 1. The figures for June 1 are based on the rate of consumption in March, April and May, and the figures for Nov. 1 on that of September and October.

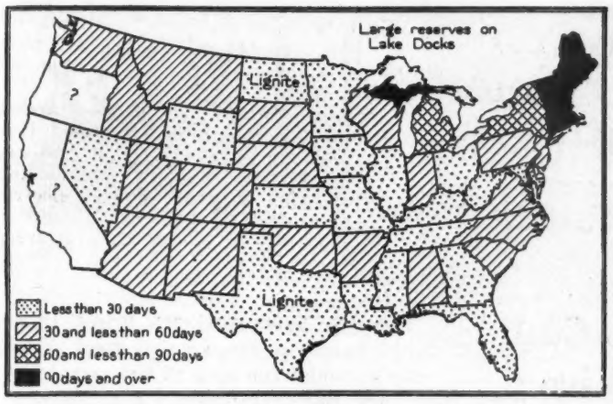


Fig. 3—Days' Supply of Soft Coal on Hand at Industrial Plants Nov. 1, 1925

This diagram shows state by state the distribution of the 44 days' supply of soft coal held at industrial plants, other than steel and byproduct coke works, on Nov. 1, 1925. New England, New York and Michigan stand out as areas of heavy reserves. Over the rest of the country, stocks are sufficient for less than 60 days.

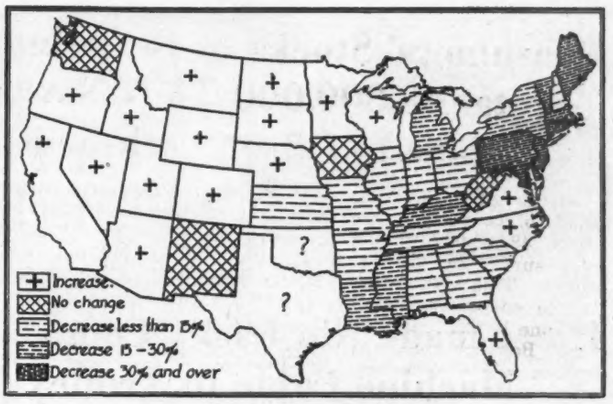


Fig. 4—Changes in Retail Dealers' Stocks of Anthracite and Bituminous Coal Combined, Sept. 1 to Nov. 1, 1925

Although retailers' stocks of bituminous coal increased from Sept. 1 to Nov. 1, the increase was more than offset by the decrease in stocks of anthracite. The total coal in dealers' yards therefore declined. In New England and the Middle Atlantic States the decrease generally exceeded 30 per cent. In the Middle West it was less. Most Far Western states gained.

Days' Supply of Bituminous Coal in Hands of Various Classes of Consumers in the United States, Jan. 1, 1919, to Nov. 1, 1925 (*a*)

(Figures represent number of days that supply would last at rate of consumption at time of stock taking)

	Jan. 1 1919	June 1, 1920	Aug. 1, 1921	Nov. 1, 1921	Sept. 1, 1922	Nov. 1, 1922	Sept. 1, 1923	Oct. 1, 1923	Sept. 1, 1924	June 1, 1925	Sept. 1(*b*), 1925	Nov. 1(*b*) 1925
By-product coke plants..	32	8	31	38	11	18	30	33	30	20	22	26
Steel plants.....	42	11	46	46	12	21	33	39	42	27	30	32
Other industrials.....	65	24	56	67	32	39	56	56	48	32	38	44
Coal-gas plants.....	81	22	79	87	34	55	110	91	90	68	67	78
Electric utilities.....	49	22	44	54	26	32	52	49	58	48	43	46
Coal dealers, bituminous	39	10	42	46	11	21	38	36	46	31	27	30
Railroads.....	32	10	(*c*)	29	13	13	44	41	42	32	28	30
Total bituminous.....	42	15	39	43	17	23	46	45	45	32	(*d*)32	(*d*)35

(*a*) These figures are based on incomplete data. (*b*) Calculated at average rate of consumption in September-October. (*c*) No data. (*d*) Subject to revision.

has received reports of only 221,000 tons in stock on Nov. 1. In March 1923, these 43 companies had on hand 808,000 tons.

Reports from all of the companies show stocks of 7,512,000 tons on the docks of Lakes Superior and Michigan on Nov. 1. Though less than the heavy reserves accumulated in the fall of 1921, this compares favorably with other recent years, as is shown by the following totals: Nov. 1, 1921, 8,824,000 net tons; Nov. 1, 1922, 2,772,000 tons; Oct. 1, 1923, 6,862,000 tons; Sept. 1, 1924, 6,600,000 tons; Sept. 1, 1925, 6,366,000 tons.

The 21 byproduct coke plants supplying gas for city use report 599,000 tons of unsold coke on hand Nov. 1. The stocks on other recent dates have been: March 1, 1922, 987,000 net tons; Oct. 1, 1923, 476,000 tons; Jan. 1, 1924, 772,000 tons; Sept. 1, 1924, 1,114,000 tons; March 1, 1925, 606,000 tons; June 1, 1925, 694,000 tons; Sept. 1. 1925, 832,000 tons.

Unlike bituminous coal, considerable quantities of anthracite are stored at the mines or at intermediate points en route to consuming centers. The Bureau of Mines has been unable to obtain complete figures of such stocks as of Sept. 1, when the strike began.

There are no statistics on householders' stocks, but from the available facts as to production and shipments, it appears that the quantity in the cellars of householders was at least up to normal when the strike began.

On Sept. 1, when the strike began, retail dealers' stocks of anthracite were large. It was not possible to obtain reports from all dealers, but a selected group of representative dealers, who have been reporting regularly for seven years, had more anthracite in stock than on the corresponding date of 1920, 1921, 1922, or 1923, and nearly as much as in 1924.

Since Nov. 1, production of anthracite has continued practically zero. Production of bituminous coal during the succeeding seven weeks averaged around the very high rate of 12,400,000 tons per week. How much of the apparent surplus of bituminous production over bituminous consumption has gone to replace anthracite and how much to increase industrial stocks of bituminous coal is not known.

Industrial Coal Consumption Declines in November

The industrial consumption of both anthracite and bituminous coal in the United States for November declined 25 per cent from the October level, according to the National Association of Purchasing Agents. This counteracts, to a certain extent, the estimated 26 per cent increase during October over the September figure. The November consumption is estimated at 37,464,000 tons. A total of 67,433,000 tons was on hand in industry Dec. 1. This is enough to last 54 days at the November daily rate of consumption of 1,249,000 tons. This is a great improvement over the situation last year, when 36½ days' supply was on hand Dec. 1.

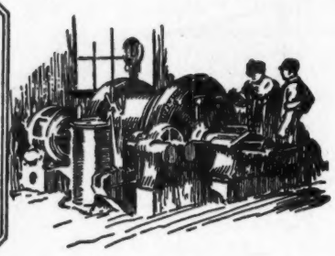
Associations Decry Shipment On Consignment

A joint conference committee, on which the National Coal Association was represented by A. W. Calloway, president, Davis Coal & Coke Co., Philadelphia; H. N. Taylor, president, United States Distributing Corp., New York City; Ezra Van Horn, general manager, Clarkson Coal Mining Co., Cleveland, and T. F. Farrell, vice-president, Pocahontas Fuel Co., New York City (substitute for W. D. Ord), and the American Wholesale Coal Association by H. K. Cortright, president, Cortright Coal Co., Philadelphia; H. J. Heywood, Toledo, and Ira C. Cochran, Washington, president and commissioner, respectively, of that association, met Dec. 16 in the offices of the United States Distributing Corp., 17 Battery Place, New York City, to discuss the practice of open consignment of coal.

At this session the wholesale representatives called attention to the fact that, while last spring there was some curtailment of the practice of open consignment, yet during the past few weeks it had again grown rapidly. It was urged that the practice undoubtedly ties up and detains coal cars, congests terminals and otherwise interferes with the orderly functioning of the industry in getting its coal to market. After an extended discussion a resolution was passed to the effect "That this committee while not in any manner desiring to make any recommendation that will influence or affect either the quantity of coal produced or the price at which it should be sold, does in its judgment believe that in the interest of economy, efficiency and proper business practice, no coal should be shipped to any market except to fill bona fide orders for same."

There was a discussion as to the advisability of the co-operation of the two associations in case of any emergency and the joint committee was adjourned to meet at the call of the two chairmen.

Practical Pointers For Electrical And Mechanical Men

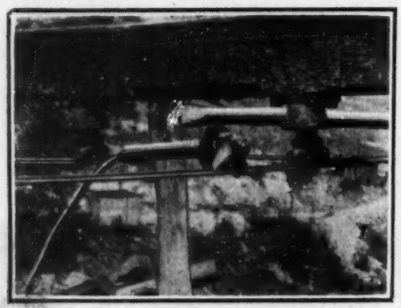


Home-made Nip Easily Connects Cutting Machine Cable to Trolley Wire

When Carson King, chief electrician of the Gatliff Coal Co., Gatliff, Ky., handed a new type of nip to one of the machine men and asked him to give it a trial, he annexed some extra work. The other operators besieged him to make nips of that type for their cutting machines.

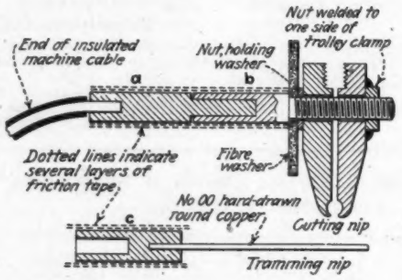
The photograph indicates how the nip is used on the end of a machine cable to make connection to the trolley wire. With this device there is no need to make the connection at a hanger, because being on the wire it does not interfere with the trolley wheels of passing locomotives. The nip is easily attached to the wire, is just as easily taken off, and makes a good connection.

For tramming, a straight piece of No. 00 copper about 15 in. in length is substituted for the clamp. The change is made by means of a plug connector in the handle. This feature is shown in the sketch. Parts *a* and *b* could have been made as one piece and arranged for fastening the tramming wire to the end, but this construction would have made the device rather heavy. A tramming nip should be as light as possible otherwise when moving long distances the operators arm will be tired by holding it up against the wire.



Nip Clamped on a Trolley Wire

It makes a tight connection and does not interfere with the trolley wheels of passing locomotives. The machine man does not have to make the connection at a hanger, but can fasten at any convenient point on the wire.



Sketch Showing Construction

A Perfection trolley clamp was used in making the cutting nip. When tramming, part *b* is pulled off of *a*, and part *c* substituted. The plug connector is of a tight fit so as to not come loose accidentally.

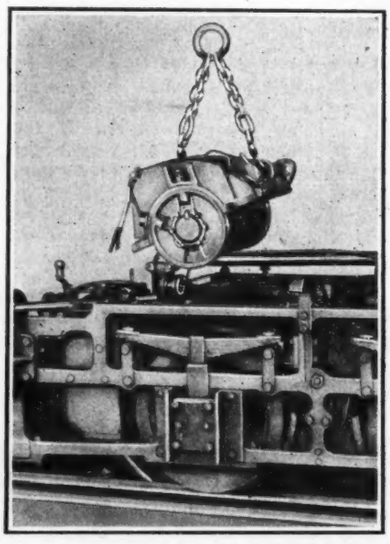
In the particular nip shown in the photograph a Perfection trolley clamp was used. The clamping-bolt hole, was reamed out to accommodate the brass stud. Any clamp of the same general type could be used. The nip is fastened to the wire by turning the handle *b* while the clamp is in position on the wire. The brass stud, screwing into the nut which is welded to one side of the clamp, brings the two halves together, making a tight connection to the wire.

Locomotive Armature Is Easily Removed

Ordinary methods used to lift armatures from mine locomotives are not only awkward but dangerous to the armature windings, commutator and workmen. The motor is always in a tight place, and to remove the upper half of the frame, slip chains under the ends of the shaft to lift the armature from the lower half of the motor, requires much time and effort. Unless more than usual precaution is taken, the chains invariably squeeze and cut the ends of the windings, and quite often scratch and cut the ends of the commutator. In some instances the sling will slip off altogether, and in so doing injure the workmen. If it were possible, most workmen would take the pains to use a small steel sling to go under the ends of the armature shaft, but that is not a safe method and is quite difficult.

Arrangement Aids Safety

Special provision for the safe and quick removal of armatures has been made on a popular type locomotive shown in the illustration. The locomotive has motors with split frames bolted around the housing, and to remove the armature all that is necessary is to take out the bolts holding the top half of the motor frame to the lower section. The entire top half, armature and all, can then be safely lifted out. In the top half of the motor frame two eyes are specially cast for this purpose.



A Safe Way to Take an Armature Out of a Locomotive

The upper half of the motor casing together with the armature are removed at once by this method. With this arrangement the armature can be removed easily and safely.

When safely out of the locomotive and on a bench, two bolts at each end release the frame section, and the armature is completely free to be repaired, without a chain ever having touched it, and within half the time usually required to perform this operation.

Whistle Warns Engineer If Fan Slows Down

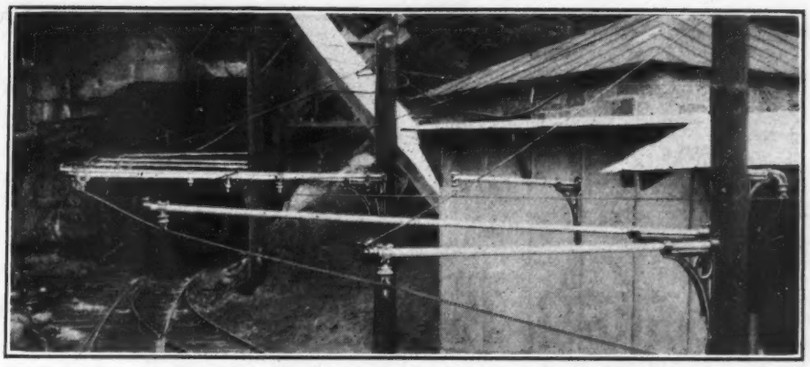
Simplicity, and a dependency on unfailing natural forces are points to be admired in any mechanical device. The old saying, "Nature abhors a vacuum," and the never-ending struggle of "Mother Earth" to pull everything closer to her bosom, explain the action of the whistle-blowing devices used on the two mine fans located near the tipple of the Woodward Iron Co.'s mine at Mulga, Ala.

The whistles call the power house engineer if for any reason either fan should stop. Each fan is equipped with both steam-engine and motor drive. Square-jaw clutches provide for changing quickly from one drive to the other.

The alarm device is shown in the photograph. A hole was cut in the fan housing and a short, 6-in. diameter nipple attached by means of a standard flange. The end of the nipple is covered by a piece of oak 8 in. in diameter by 2 in. thick, to which the whistle wire is fastened. This wooden block is held over the opening by atmospheric pressure. The end of a nail projecting slightly out of the side of the block, so as to rest on the bottom side of the nipple, aids in keeping the block from working off due to vibration. Any appreciable reduction in vacuum allows the block to tip sidewise and fall off, thus blowing the whistle.

Wood Block Falls If Fan Slows

The fan operates exhausting. In order to show the 6-in. opening beneath, the wooden block was pushed slightly to one side. The wire extending from the upper arm of the bell crank goes to the steam whistle.



Permanent Trolley Construction at a Tennessee Mine

At this mine operated by the New Caryville Coal Co., Carryville, Tenn., the outside trolley is supported by pipe bracket arms fastened to large locust poles. Standard cast-iron brackets and regular outer-end castings are used in connection with 1¼-in. galvanized pipe. On the curves, as many as three arms are fastened to each pole.

Simple Mistake Holds Up Important Work

Often the troubles encountered in putting a new piece of equipment in service are caused by some simple mistake which has passed unnoticed until hunted down. This was well illustrated by the failure to obtain proper voltage on one of our power lines because of an error in making a tap connection.

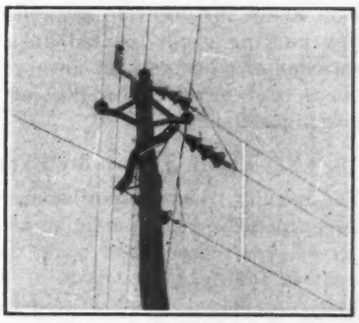
At one of our mines, during the first part of December, 1924, when snow was beginning to fly, orders suddenly came to rebuild a power line which recently had been abandoned. The line had originally been used to supply electricity for a fresh-water centrifugal pump located half a mile from the main road.

When the line was taken down the plan was to drive the pump by steam until details of a more elaborate electrical system could be worked out. In September, when the anthracite strike was declared, the supply of fuel was cut off and recourse to electricity was necessary.

Men were quickly summoned to reconstruct the power line. The old steel poles which had been taken down but a few months previous were again set in position on their original foundations. Because the line voltage now available was higher than that formerly used, 4x6-in. lumber was bolted to the poles to serve as crossarms to which new insulators were attached.

In a few days the line was completed and two transformers connected in open delta were put in position near the pump to reduce the voltage to that required by the motor. When all was ready, power was shut off the main line and the branch circuit was attached.

The following day the transformers were energized and a voltage test was made on the low tension side. Much to the surprise of everyone the phase readings were 450, 450 and 0 volts. After the high voltage wires were interchanged the readings were



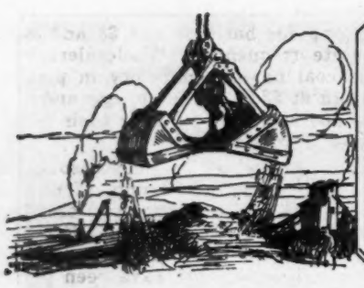
Wrong Connection Caused Trouble

When the branch circuit was connected to the main supply line two of the tap circuit wires were attached to the same main power conductor. This error caused much delay.

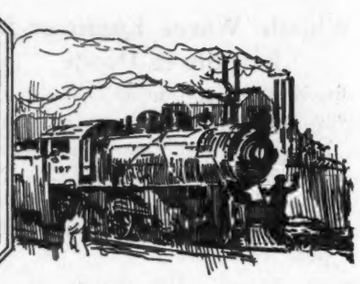
450, 450 and 900 volts. Two primary wires were again reversed and the indications became 450, 450 and 0.

As the transformers were "borrowed horses," having been leased, it was thought that there was something internally wrong with one of them. However, it was noticed that the voltage readings obtained during the test did not bear the familiar 1.73 ratio to one another when the windings of three-phase systems ordinarily get mixed up. All indications were that one single-phase voltage was either neutralizing itself or doubling itself. This really was the case, the lineman having connected two of the branch circuit wires to one of the main supply line conductors, as shown in the accompanying illustration. Thus a puzzling difficulty which was easily caused was quickly remedied after about a day's loss of time.

M. A. THOMAS,
Hazleton, Pa. Engineer.



Production And the Market



Outlook Brightens as Trade Marks Time; Hard Coal Substitutes Firmer

As might have been expected by close observers of coal-market activities, business during the last week has been marked by the usual year-end tendency to mark time while plans are in preparation for a fresh start, with the possibility of facing new problems and conditions with the dawning of a new year. Needless to say, the year just closing has brought to the trade its share of disappointments in the way of blasted hopes, due in many instances to grandiose expectations of a happy hunting ground based upon the belief that the suspension of mining in the anthracite field would bring about a mad scramble for coal of any kind by panic-stricken consumers.

Public Profits by Experience

The usually wise old gentleman of hallowed memory who characterized the public as an ass no doubt would be greatly surprised if he could now observe the comparatively indifferent attitude of hard-coal consumers, a large proportion of whom laid in fuel in advance of the strike or cheerfully turned to substitutes when their customary fuel was unobtainable at normal prices—quite a contrast from the distraught atmosphere prevailing during previous upheavals. In addition to the satisfaction of successfully combating a vexing problem and avoiding discomfort many will enjoy a considerable saving on their fuel bills. An interesting chapter in the drama remains to be written, of course, and this has to do with whether a new agreement terminating the strike if and when arrived at can be formulated that will give sufficient assurance of uninterrupted operations to enable the producers to win back the trade they have lost.

A touch of cold weather beginning early last week served to preserve a semblance of firmness in the price situation, and a further drop in temperature later brightened the outlook considerably. The softening tendency of almost record coal production also is feeling the counteracting effect of curtailed running time due to observance of the holidays.

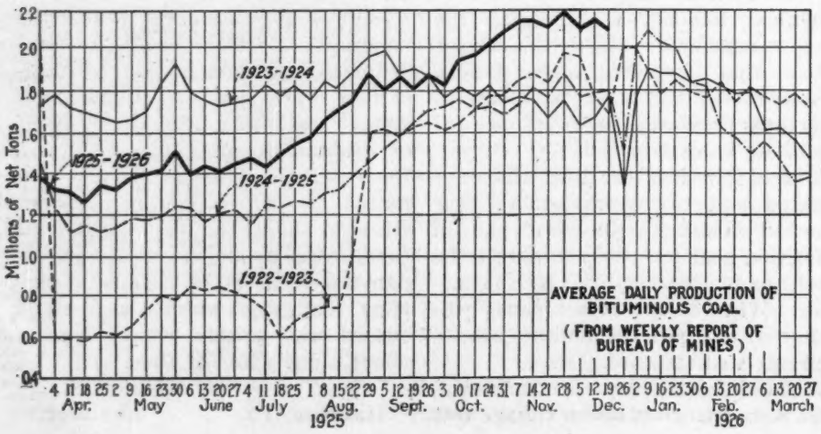
Activity in anthracite substitutes seems to have taken a new lease of life since Governor Pinchot's efforts for peace showed a likelihood of dragging a while before getting anywhere. Coke demand and prices continue their recent upturn. It is too early as this is written to be able to say whether this week's conference of operators and union leaders presages an early resumption of work at the mines or just a renewal of the indoor hammer throwing.

Output Hovers Over 12,500,000 Tons

Output of bituminous coal during the week ended Dec. 19 is estimated by the Bureau of Mines at 12,600,000 net tons, a decline of 314,000 tons from the total for the preceding week but nearly 1,800,000 tons above that of the corresponding week of last year. Anthracite production in the week ended Dec. 19 totaled 55,000 net tons, compared with 64,000 tons in the previous week. Hard-coal output during the calendar year to Dec. 19 is 62,064,000 tons, or about 29 per cent less than in the corresponding period of 1924.

Coal Age Index of spot prices of bituminous coal stood on Dec. 28 at 178, the corresponding price being $2.16, compared with 179 and $2.17 respectively on Dec. 21.

Dumpings of coal at Hampton Roads during the week ended Dec. 24 totaled 446,093 net tons, as against 457,157 tons in the preceding week.



Estimates of Production

(Net Tons)

BITUMINOUS

	1924	1925
Dec. 5	10,831,000	12,868,000
Dec. 12 (a)	10,873,000	12,914,000
Dec. 19 (b)	10,814,000	12,600,000
Daily average	1,802,000	2,100,000
Cal. yr. to date	(c) 465,668,000	506,293,000
Daily av. to date	1,566,000	1,697,000

ANTHRACITE

Dec. 5	1,814,000	62,000
Dec. 12	1,772,000	64,000
Dec. 19 (b)	1,867,000	55,000
Cal. yr. to date	(c) 87,811,000	62,064,000

(a) Revised since last report. (b) Subject to revision. (c) Minus two days' production to equalize number of days in the two years.

Midwest Trade in Depths

Though there were a few days of cold weather last week, the Midwest market is duller than it has been for three months. Dealers are holding off purchasing until after the first of the year. The running time in the Illinois and Indiana fields has been very poor, some mines running not more than two days a week, and there are heavy accumulations of "no bills" on track. This does not worry the operators much, however, as they feel that the first real cold snap will clean up these quickly. Prices in the Illinois and Indiana fields are being held firm, as it is doubtful whether the coal could be moved even if a concession were made in price. While every operator has difficulty in moving prepared coal, there is quite a demand for fine coal, which is, however, very limited. Prices on this coal have gone up considerably, screenings bringing as high as $2 for Franklin County, $1.75 for Fourth Vein Indiana, and $1 for west Kentucky.

West Virginia operators are offering their coal at unheard of prices to keep their mines going. When 4-in. lump is offered as low as $1.85, conditions are not at all healthy. However, they all figure on a break that is bound to come with a change in the weather.

The Pocahontas operators have been hit the hardest. Whereas they were getting $4.25 for prepared sizes a year ago, today they are begging for business and $3 and even less, has been quoted quite frequently. Wholesalers who specialize in Pocahontas coal have no difficulty in placing orders with large operators at $3.25 for lump, egg and nut, and the majority of the operators are running their mines three or four days a week at the most.

Seasonable weather is beginning to move southern Illinois coals that have been dragging. Lump, of course, is beginning to move first, and this is pretty well cleaning up "no-bill" lump on track in the Williamson and Franklin County fields. There is some call for egg, but nut and screenings are slow, although screenings have been pretty well cleaned up recently while the other sizes were sluggish. Railroad tonnage is fairly good from the shaft mines and some is moving from the strip mines. Car supply is good, movement of coal fair and working time ranges from three to five days a week. Similar conditions exist in the Duquoin and Jackson County field. There has been no change in prices excepting those of the strip mines, which vary weekly in meeting competition.

In the Mt. Olive field there has been a sudden pick-up in both steam and domestic. This field was heavily taxed with "no bills" until last week, when these began to move out. Working time is about 50 per cent here and railroad tonnage has dropped off. In the Standard field, even with colder

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern	Market Quoted	Dec. 29 1924	Dec. 14 1925	Dec. 21 1925	Dec. 28 1925†
Smokeless lump	Columbus	$3.85	$4.25	$3.50	$3.25@$3.75
Smokeless mine run	Columbus	1.90	2.85	2.75	2.65@ 2.90
Smokeless screenings	Columbus	1.10	2.60	2.60	2.50@ 2.75
Smokeless lump	Chicago	3.75	3.60	3.10	**3.25@ 3.50**
Smokeless mine run	Chicago	1.85	2.35	2.15	*2.00@ 2.25*
Smokeless lump	Cincinnati	3.75	4.25	3.60	**3.50@ 4.50**
Smokeless mine run	Cincinnati	1.85	2.35	2.35	**2.50@ 2.65**
Smokeless screenings	Cincinnati	1.25	1.85	1.85	1.75@ 2.00
*Smokeless mine run	Boston	4.05	5.00	5.00	*4.90@ 5.10*
Clearfield mine run	Boston	2.00	1.90	2.00	*1.75@ 2.10*
Cambria mine run	Boston	2.35	2.20	2.30	*2.10@ 2.50*
Somerset mine run	Boston	2.15	2.05	2.10	*1.90@ 2.25*
Pool 1 (Navy Standard)	New York	2.80	2.95	2.95	2.75@ 3.15
Pool 1 (Navy Standard)	Philadelphia	2.70	2.95	2.95	2.80@ 3.10
Pool 1 (Navy Standard)	Baltimore	2.30	2.20	2.20	2.20@ 2.25
Pool 9 (Super. Low Vol.)	New York	2.10	2.30	2.30	2.15@ 2.50
Pool 9 (Super. Low Vol.)	Philadelphia	2.15	2.30	2.30	2.20@ 2.45
Pool 9 (Super. Low Vol.)	Baltimore	1.70	2.00	2.00	2.00@ 2.05
Pool 10 (H.Gr.Low Vol.)	New York	1.95	2.05	2.10	1.90@ 2.25
Pool 10 (H.Gr.Low Vol.)	Philadelphia	1.75	2.05	2.05	2.00@ 2.15
Pool 10 (H.Gr.Low Vol.)	Baltimore	1.55	1.90	1.90	1.90@ 1.95
Pool 11 (Low Vol.)	New York	1.60	1.75	1.75	1.65@ 1.90
Pool 11 (Low Vol.)	Philadelphia	1.45	1.90	1.90	1.85@ 2.00
Pool 11 (Low Vol.)	Baltimore	1.45	1.65	1.65	1.60@ 1.70
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.50	1.60	1.60	1.50@ 1.70
Pool 54-64 (Gas and St.)	Philadelphia	1.50	1.60	1.60	1.55@ 1.70
Pool 54-64 (Gas and St.)	Baltimore	1.45	1.65	1.65	1.65@ 1.70
Pittsburgh sc'd gas	Pittsburgh	2.40	2.85	2.65	2.60@ 2.75
Pittsburgh gas mine run	Pittsburgh	2.10	2.35	2.10	2.00@ 2.25
Pittsburgh mine run (St.)	Pittsburgh	1.85	2.05	2.05	2.00@ 2.10
Pittsburgh slack (Gas)	Pittsburgh	1.30	1.55	1.55	1.50@ 1.60
Kanawha lump	Columbus	2.30	2.60	2.25	2.00@ 2.50
Kanawha mine run	Columbus	1.55	1.70	1.70	1.55@ 1.85
Kanawha screenings	Columbus	.95	1.20	1.20	1.15@ 1.25
W. Va. lump	Cincinnati	2.15	2.75	2.75	*2.00@ 2.75*
W. Va. gas mine run	Cincinnati	1.50	1.55	1.65	*1.60@ 1.65*
W. Va. steam mine run	Cincinnati	1.40	1.50	1.55	*1.50@ 1.60*
W. Va. screenings	Cincinnati	1.00	1.10	1.15	*1.00@ 1.20*
Hocking lump	Columbus	2.50	2.60	2.35	2.25@ 2.50
Hocking mine run	Columbus	1.60	1.80	1.85	1.75@ 2.00
Hocking screenings	Columbus	1.10	1.25	1.25	1.20@ 1.30
Pitts. No. 8 lump	Cleveland	2.40	2.35	2.35	1.95@ 2.75
Pitts. No. 8 mine run	Cleveland	1.85	1.85	1.85	1.80@ 1.90
Pitts. No. 8 screenings	Cleveland	1.40	1.45	1.45	**1.50@ 1.60**

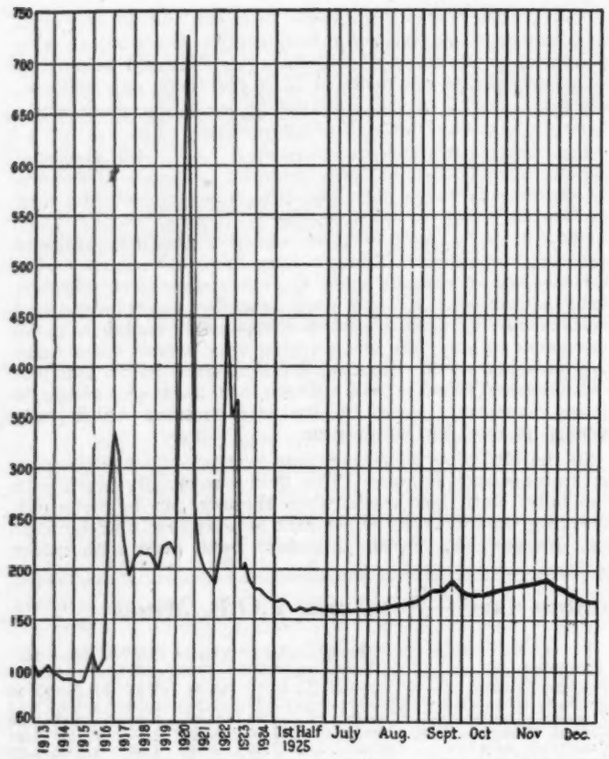
Midwest	Market Quoted	Dec. 29 1924	Dec. 14 1925	Dec. 21 1925	Dec. 28 1925†
Franklin, Ill. lump	Chicago	$3.35	$3.50	$3.35	$3.25@$3.50
Franklin, Ill. mine run	Chicago	2.35	2.50	2.50	2.35@ 2.65
Franklin, Ill. screenings	Chicago	1.90	1.85	1.85	1.75@ 2.00
Central, Ill. lump	Chicago	3.00	3.00	2.85	2.75@ 3.00
Central, Ill. mine run	Chicago	2.20	2.30	2.30	2.25@ 2.35
Central, Ill. screenings	Chicago	1.90	1.40	1.40	1.35@ 1.50
Ind. 4th Vein lump	Chicago	3.35	3.10	3.00	2.75@ 3.25
Ind. 4th Vein mine run	Chicago	2.35	2.35	2.30	2.25@ 2.35
Ind. 4th Vein screenings	Chicago	1.85	1.85	1.85	1.75@ 2.00
Ind. 5th Vein lump	Chicago	3.00	2.50	2.50	2.35@ 2.65
Ind. 5th Vein mine run	Chicago	2.10	1.95	1.95	1.85@ 2.10
Ind. 5th Vein screenings	Chicago	1.70	1.40	1.40	1.35@ 1.50
Mt. Olive lump	St. Louis	3.00	2.85	2.85	2.75@ 3.00
Mt. Olive mine run	St. Louis	2.35	2.00	2.00	2.00
Mt. Olive screenings	St. Louis	1.10	1.75	1.75	1.75
Standard lump	St. Louis	2.75	2.40	2.40	2.35@ 2.50
Standard mine run	St. Louis	1.95	1.80	1.80	1.75@ 1.90
Standard screenings	St. Louis	1.05	.85	.85	.75@ 1.10
West Ky. block	Louisville	2.35	2.10	2.00	1.85@ 2.15
West Ky. mine run	Louisville	1.55	1.35	1.35	1.25@ 1.50
West Ky. screenings	Louisville	1.10	.95	.95	**.90@ 1.10**
West Ky. block	Chicago	2.35	2.05	2.00	1.75@ 2.25
West Ky. mine run	Chicago	1.50	1.25	1.25	1.15@ 1.35
South and Southwest					
Big Seam lump	Birmingham	2.85	2.75	2.75	$2.50@$3.00
Big Seam mine run	Birmingham	1.70	2.10	2.10	2.00@ 2.25
Big Seam (washed)	Birmingham	1.85	2.30	2.30	2.10@ 2.50
S. E. Ky. block	Chicago	2.50	3.25	3.10	*2.75@ 3.25*
S. E. Ky. mine run	Chicago	1.45	2.15	2.15	*1.75@ 2.00*
S. E. Ky. block	Louisville	2.50	3.25	3.00	*2.50@ 3.25*
S. E. Ky. mine run	Louisville	1.35	1.60	1.60	1.50@ 1.75
S. E. Ky. screenings	Louisville	.95	1.25	1.10	**1.00@ 1.35**
S. E. Ky. block	Cincinnati	2.25	2.85	2.85	2.75@ 3.00
S. E. Ky. mine run	Cincinnati	1.45	1.60	1.60	1.50@ 1.75
S. E. Ky. screenings	Cincinnati	1.00	1.10	1.15	*.95@ 1.25*
Kansas lump	Kansas City	5.00	5.00	5.00	5.00
Kansas mine run	Kansas City	3.10	3.10	3.10	3.00@ 3.25
Kansas screenings	Kansas City	2.50	2.30	2.30	2.25@ 2.35

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**; declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Dec. 29, 1924 Independent	Dec. 29, 1924 Company	Dec. 21, 1925 Independent	Dec. 21, 1925 Company	Dec. 28, 1925† Independent	Dec. 28, 1925† Company
Broken	New York	$2.34	.....	$8.00@$9.25	.....	.....	.....	.....
Broken	Philadelphia	2.39	.....	9.15	.....	.....	.....	.....
Egg	New York	2.34	$8.50@$8.75	8.75@ 9.25	.....	.....	.....	.....
Egg	Philadelphia	2.39	9.45@ 9.75	8.80@ 9.25	.....	.....	.....	.....
Egg	Chicago*	5.06	8.17@ 8.40	8.08	$9.50@$10.00	$8.03@$8.25	$9.50@$10.00	$8.03@$8.25
Stove	New York	2.34	9.75@10.25	9.00@ 9.50	.....	.....	.....	.....
Stove	Philadelphia	2.39	10.10@10.75	9.15@ 9.50	.....	.....	.....	.....
Stove	Chicago*	5.06	8.80@ 9.00	8.53@ 8.65	10.00@11.00	8.48@ 8.80	10.00@11.00	8.48@ 8.80
Chestnut	New York	2.34	9.75@10.25	8.75@ 9.40	.....	.....	.....	.....
Chestnut	Philadelphia	2.39	10.00@10.75	9.25@ 9.40	.....	.....	.....	.....
Chestnut	Chicago*	5.06	8.61@ 9.00	8.40@ 8.41	10.00@11.00	8.50@ 8.75	10.00@11.00	8.50@ 8.75
Pea	New York	2.22	4.50@ 5.50	5.50@ 6.00	.....	.....	.....	.....
Pea	Philadelphia	2.14	5.75@ 6.00	6.00	.....	.....	.....	.....
Pea	Chicago*	4.79	5.36@ 5.75	5.36@ 5.95	5.50@ 6.00	5.50@ 6.00	5.50@ 6.00	5.50@ 6.00
Buckwheat No. 1	New York	2.22	2.00@ 2.75	3.00@ 3.15	.....	.....	.....	.....
Buckwheat No. 1	Philadelphia	2.14	2.50@ 3.00	3.00	.....	2.50@ 3.00	.....	2.50@ 3.00
Rice	New York	2.22	1.90@ 2.25	2.00@ 2.25	.....	.....	.....	.....
Rice	Philadelphia	2.14	2.00@ 2.25	2.25	.....	.....	.....	.....
Barley	New York	2.22	1.30@ 1.60	1.50	.....	.....	.....	.....
Barley	Philadelphia	2.14	1.50	1.50	.....	.....	.....	.....
Birdseye	New York	2.22	1.40@ 1.75	1.60	.....	.....	.....	.....

*Net tons, f.o.b. mines. †Advances over previous week shown in **heavy type**; declines in *italics*.



Coal Age Index of Spot Prices of Bituminous Coal F.O.B. Mines

	1925			1924
	Dec. 28	Dec. 21	Dec. 14	Dec. 29
Index	178	179	182	171
Weighted average price..	$2.16	$2.17	$2.20	$2.06

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States, weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1924, as 100, after the manner adopted in the report on "Prices of Coal and Coke; 1913-1918," published by the Geological Survey and the War Industries Board.

weather, there is no great change. A little more coal is moving but there is still a surplus of all sizes available. Working time ranges from three to four days a week and prices are about the cost of production. Railroad tonnage shows some improvement in this district. With colder weather coming and decreased tonnage at the working mines, there is likely to be a shortage before long, which may boost prices.

Colder weather has stimulated the St. Louis market to some extent and this is best evidenced in the pick-up of wagonload steam, which got off to a good start last week. Carload steam is fair, a few plants putting in a little storage and other plants cleaning up for inventory. Country steam is quiet, a little moving to Kansas City, and some steam nut to Omaha and some cheap priced coal to Chicago and the Twin Cities. Domestic locally is fairly good on middle-grade coals. Standard also shows considerable movement while smokeless and anthracite are slow and coke moving fairly well. Country domestic is good, everything considered. All sizes are moving in proportion and there is a fairly good country demand for coke. Locally the coke supply is pretty well cleaned up excepting what is being held and reserved for January, and local shippers have nothing to offer for Northern or Eastern shipments. No change in prices.

Outlook Bright in Kentucky After Holidays

Cold weather and snow early last week in Kentucky along with usual holiday retail business brought some demand from retailers on coal rolling, or on local tracks, and it is believed that with production lower as a result of the holiday season, there is a good chance that prices will be higher by 25c. a ton soon, if the present weather lasts.

There appears to be an easing up in steam demand over the holiday or inventory period, some industrial plants slowing down their output. Heating demand is picking up and the utility companies are using increased supplies.

Prices are firm on all western Kentucky sizes, and in fact a trifle stronger on mine-run and screenings. In eastern Kentucky prepared has been a trifle weaker on account of West Virginia competition and lower quotations.

Principal quotations on eastern Kentucky 4-in. block are $2.50@$3.25, but some stock is quoted higher. Lump and egg are around $2.15@$2.50, some quotations being $2.25@$2.75; nut, $2@$2.50; mine-run, $1.50@$1.75; screenings, $1@$1.35. In western Kentucky 6-in. block is $1.85@$2.15; lump and egg, $1.75@$2; nut, $1.35@$1.50; screenings, 90c.@$1.10. Western Kentucky mine-run is firmer, some houses quoting at $1.25, but not much stock is to be had at under $1.35 and some is at $1.50 or better. Western Kentucky screenings are scarce and commanding better prices.

Northwest Trade Unchanged but Firm

The Duluth-Superior market is firm and unchanged all through the bituminous list. The feature in the trade continues the heavy demand for Pocahontas and other smokeless coals as substitutes for anthracite. Pocahontas lump, egg and nut are quoted at $8.50 and mine-run at $5.50. Anthracite prices are firm and just as they have been since early last summer. On account of the greater use of substitutes and mild weather conditions it is now figured that anthracite will be available upon this market in a limited way up till early in February.

Shipments of coal from the docks are keeping well up to the average for the season though the weather has been comparatively mild during the last ten days. A substantial improvement in the movement after the opening of the new year is expected, as retailers and the larger consumers are reported to be carrying comparatively small stocks. Orders booked for early January shipment are said to have reached a good total.

An encouraging feature is the better interest shown by independent iron operators on the Minnesota ranges. Larger tonnages of steam coal are being supplied to utilities on account of low water. Industrial demand is expected to show marked expansion early in the new year.

With anthracite out of the reckoning, the fuel market in Milwaukee seems to have steadied for the weeks of real winter which are now at hand. The demand is brisk because of the weather, and of course may be expected to become more lively as the mercury dips. Coke has taken the place of anthracite and is steady at $15 for range, $14 for nut and $12 for the pea size.

Autumn business in the Twin Cities has been steady, with a gradual gain toward former conditions. Until there is some method of readjustment of inequalities of freight charges, the industrial situation is bound to be restricted and of limited activity. The retail situation is good. Buying is steady and constant, and the weather so far has been free from extreme changes that would bring about a rush of orders to be delivered at once.

Southwest Has Partial Pick-Up

Kansas lump, which had accumulated on tracks, started moving with the return of cold weather, and the tracks soon were cleared. Arkansas, however, did not fare so well. There the mines continue to add to their record of idle time. Arkansas semi-anthracite lump is moving slowly, with no immediate prospect of improvement; mine-run is easy, and screenings are short. The Arkansas market is not expected to improve until some time after the first of the year, when bins filled early in the fall have begun to get low. Arkansas prices are unchanged at $6@$6.50 for lump; $2.75@$3.50 for mine-run and $2@$2.25 for screenings. Kansas nut has been easy, with screenings a little short. Kansas mines have lost little time this season.

The Colorado market appears to be a little soft due to warm weather in Missouri River territory. Domestic orders are being held back as bins are pretty well stocked. Production in Colorado in November was 1,167,000 tons compared with 988,000 tons for the same month a year ago. The average number of men employed in the mines was 11,829 and the number of days worked per mine was 157.9.

The market served by the Utah mines, which has been quiet for several weeks, is improving with more seasonable weather. Working time at the mines for the past week was a little above 50 per cent. A leading retailer reports a better market for domestic lump than straight lump. It is

estimated that there were about 300 "no bill" cars on the tracks this week. Slack is a little scarce, but not as a result of market conditions so much as short working time at the mines. Demurrage rules were recently suspended, but the "no-bill" rule is in force again, which means that loaded cars are regarded as cars on hand when empties are apportioned by the railroads.

The metal mining and smelter industries and the railroads are most active in the market now. There is an abundance of labor at the mines, and many men are turned away regularly.

Smokeless Revives in Cincinnati

Any bright spot to be found in a glum situation on the Cincinnati market is due to the way smokeless has been acting. For a month the skids seemed well greased for low-volatile prices, but just before Christmas the brakes seemed to hold and, even better, there was a sign of a rebound. Most of this is traceable to demand from the East after the futility of Governor Pinchot's efforts for peace in the anthracite field became apparent. Mostly nut and egg were wanted, with Canada partaking of the demand. With shutdowns and other conditions helping, nut went up to $4.50 for spot, egg climbed over the $4 mark with $4.25 paid for first-grade Pocahontas. Lump, usually the strongest of the preferred, still lags, though it bettered itself by 25c. Mine-run with holiday shutdowns in prospect, stiffened, some tonnage going as high as $2.65. Slack still is trying to find itself with no change.

Overproduction—shown glaringly in the American Railway Association report of 13,862 loads passing through the Cincinnati gateway, or an increase of 555 cars on an overstuffed market—explains why there have been some marked reductions in price for high-volatile domestic sizings. Refusals have been coming in from many points, Michigan being, possibly, the worst offender. Distress coal again is setting the spot price, dragging other good fuel along with it. Some lump went below $2, some egg below $1.75, weakening straight sales also. In contrast to this, mine-run and slack are holding up well. About the only break in the latter is in Kentucky low grades, some of which have sold down to 90c. under pressure of competition.

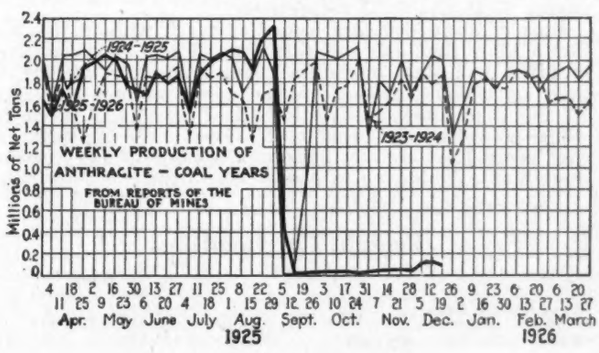
Retail trade shows little or no change other than the spurt for small deliveries caused by snow and cold weather just before Christmas. River business continues in an even channel.

Demand for domestic grades has been rather dull in Columbus and vicinity during the past week. Dealers are pretty generally stocked and householders are going slow in placing orders, but retail prices have not declined. There is a considerable amount of free coal on the market and the tonnage of consignment fuel is increasing not only in Columbus but in Toledo and Detroit.

Large steam users are buying for current needs only. There will be little doing in contracting before March. Utilities are good purchasers and iron and steel plants are also in the market. Screenings are holding up exceptionally well.

Production in the southern Ohio field averages about 25 per cent of capacity, with the Pomeroy Bend district showing up the best.

Market conditions in eastern Ohio are more sluggish. Screenings prices have advanced to $1.50@$1.60, other quotations being soft. Most of the mines closed from Thursday till Monday. Production fell away the week before. As retailers are fully stocked and steam buyers holding off, operators are pessimistic as to the immediate future.



Conditions Quiet at Pittsburgh

Demand for domestic coal from the regular territory of the Pittsburgh district has been rather poor. Railroad and industrial demand have been moderate, consumption being fully as great as could be expected. There is but little outside demand for Pittsburgh district coal. The call of the East, such as it is, now runs to "nut" coal. On the East's last buying the movement was chiefly in "egg" but it seems the operators had altogether too large eggs in mind, sizes running up to 4-in.

With the figures for the last week in December estimated, production by central Pennsylvania coal mines will total 43,500,671 tons in 1925, which is four million tons more than in 1924. The year started off well and then fell into a slump, with production reviving following the strike of miners in the anthracite field, which was largely responsible for the increased production. Approximately 60 per cent of the total production was in mines working on a non-union basis, or under the 1917 scale. The remainder was produced from mines under the Jacksonville agreement.

Prices, except on coke, remain the same from week to week. Coke shows a little increase, egg sizes being quoted at $7.50@$8; run-of-ovens, $6.50@$7; lump coal, $3.50@$4; egg, $4.50@$5; nut, $4.25@$4.75; mine-run, pool 1, $2.75@$2.95; pool 71, $2.50@$2.75; pool 9, $2.35@$2.50; pool 10, $2.20@$2.35; pool 11, $1.70@$2; pool 1, $1.60@$1.70.

At Buffalo the whole trade is so completely at the bottom that even an effort to vary the regular bituminous quotations has been useless. Just now there is a scarcity of slack, but nobody is getting much, if any, more for it, and the chances are that the mine-run output will take up any real shortage in that line. Quotations are $1.60@$1.75 for Fairmont lump, $1.40@$1.50 for mine-run, $1.25@$1.40 for slack; $2.25@$2.50 for Youghiogheny gas lump, $2@$2.25 for Pittsburgh and No. 8 steam lump, $1.30@$1.60 for all slack; $1.75@$2 for Allegheny Valley mine-run; $6.50@$6.75 for Cambria County smokeless; $12 for egg coke, at the curb.

Dullness Lifts Slightly in New England

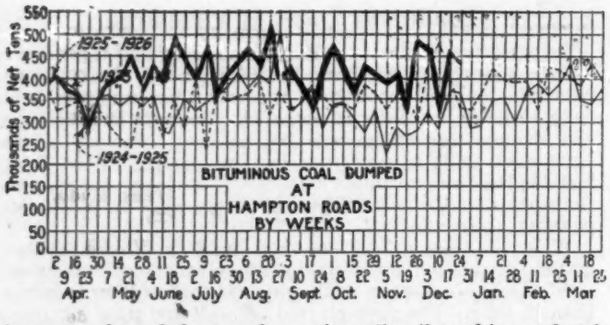
With more seasonable weather the demand for steam coal is somewhat improved in New England. Retailers are again mildly interested in the spot market and transient business in general is noticeably less dull than a week ago. Curtailed production in the smokeless districts has reduced the volume at and en route to Hampton Roads piers, while shipments on contract have increased sufficiently to influence current prices to a moderate degree. In no direction is there brisk inquiry; even for prepared Pocahontas and New River there is only lukewarm request. As a whole, however, the market is in a more hopeful situation than since early November.

A few outlying communities are taking on bituminous and coke in anticipation of running out of anthracite by the end of January, but the aggregate tonnage is not large and there is little to build on in such quarters. If hard-coal mining is resumed by Jan. 15 there will still be a reasonably good demand for substitutes, but the trend will be away from them in favor of anthracite as soon as the latter can be had. The January market will depend somewhat on the volume the hard-coal shippers are able to pour into this territory. For industrial uses there will be no sharp request; the high rate of production since Oct. 1 has anticipated anything like emergency needs during the next 30 to 60 days, and after the holiday season the trade expects only ordinary business. Doubtless steps will be taken to prevent ruinously low prices for high-grade coals.

At Hampton Roads spot coal of No. 1 grade may be had at $5 or slightly less f.o.b. vessel, and at Boston, Providence and Portland on cars the accepted figure per gross ton is $6.50. Moderate congestion at the railroad wharves is in part responsible for this firmer tendency, although more and more household users are turning to mine-run rather than to lump and egg as a substitute for anthracite.

All-rail from central Pennsylvania there is only fair demand for steam coal, and then only for the more favorably known grades. For screened egg of navy standard quality, $5@$5.25 seems to be obtainable, while run-of-mine is quoted at $2.25@$2.50.

Pocahontas and New River prepared coal is being offered all-rail at a wide range of prices. On the same day the trade is offered lump and egg from one operation at $4, from another source a $3 price is named. The aggregate


Thousands of Net Tons
1925-1926
1924-1925
BITUMINOUS COAL DUMPED AT HAMPTON ROADS BY WEEKS
Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar

tonnage of smokeless coals coming all-rail to this market is by no means heavy.

Steady Movement of Mine-Run at New York

Mine-run bituminous coal continues to move steadily in the New York market, prices remaining firm and practically unchanged. Prepared sizes from central Pennsylvania were in fair call last week, while egg and nut sizes of Pocahontas and New River were in better demand than during the previous few weeks. Nut fared better than egg, being quoted at $4.25@$4.75 as against $4@$4.50 for the larger size.

Short running time at the mines during the holidays is not expected to alter the situation in the trade. There is sufficient coal on tracks to take care of any rush of orders without causing any undue excitement.

Shippers of Southern coals into this market look for increased buying of those coals after Jan. 1, when the new freight tariff affecting the New York and New Jersey markets goes into effect. The new rate averages about $1.10 above the present Clearfield rate of $3.09 to this market.

An end-of-the-year quietness seems to have overtaken the Philadelphia market, but at the first of the year buying should begin with renewed vigor. Despite the quietness of the market spot prices continue fairly stable. For one thing there is no "distress" coal hanging around. There is a little talk about contracts for the first of the year, but with only a small amount of such business closed thus far.

With the strong pick-up in the coke trade there has been a much better inquiry for sized bituminous fields. Slack has been somewhat scarce during the past ten days, due to the falling off in the call for three-quarters and sized coal. However, it would not be surprising to see a considerable increase in slack with the better demand for sized fuel.

The Christmas lull brought no special regrets this year to the soft-coal trade at Baltimore. There is ample coal at tide and awheel between the mines and this point to take care of all needs promptly and, with the exception of a two-weeks flurry in prepared sizes immediately after the onset of the anthracite strike, prices have not varied more than 10 to 15c. f.o.b. mine since Sept. 1. This is undoubtedly due to the moderate home call, despite the use of bituminous as a substitute for anthracite in the East and because of the slump in the export trade. During the past week mines No. 1 and 12 of Consolidation Coal Co. were reopened and in the Georges Creek region of western Maryland there has been an improvement in production, the November figures being 20,000 tons in excess of those of October.

The commercial market at Birmingham has eased up noticeably in the past week or so, inquiry having fallen off materially and the clamor for deliveries having become less insistent. Movement has been exceptionally heavy for several weeks and it is presumed that all large consuming interests are comfortably well fixed on reserves. The mines are in no immediate need of bookings on which to operate after the holidays, and opinion in the trade is that prospects for the first quarter are satisfactory as far as steam coal is concerned. Buying for bunkers has not abated, though it is not quite as active as it has been, and inquiries are still coming in for extra tonnage.

The lull in the domestic market is more pronounced than in the steam trade. Little new business is being taken on at present, as weather conditions have been unfavorable. A light snow followed by lower temperatures late in the week will no doubt stimulate buying temporarily if the cold spell is of sufficient duration, as stocks in the hands of dealers and consumers are light.

Quotations have undergone no change the last week and seem fairly well entrenched against decline in the near future.

Inquiry from northern and western points for coke has improved in the past week, and demand continues good in local territory. Foundry ranges $6@$6.50, gas-house, $6@$6.50, and egg and nut, $4.75@$5.50 per ton ovens.

Coal output in the week ended Dec. 12, which reached 450,000 tons as reported to the Alabama Mining Institute, broke the record of this field for a similar period with the possible exception of one week in 1923, on which the records are not exactly clear.

Hard-Coal Substitutes Stiffen

Lower temperatures in New York last week strengthened the demand for anthracite substitutes, coke heading the list with better prices. Some manufacturers are said to be refusing orders because they are sold up. Beehive coke is quoted at $8.25@$8.75. Most retail dealers are awaiting continued colder weather before increasing their buying orders, as consumers are unwilling to put in large tonnages of substitutes in view of the various efforts being made to bring the strike to an end.

Nothing but No. 1 buckwheat in the hard-coal list is to be found in the harbor and most of it is not of very good quality, according to the dealers. Quotations range from $9 to $10 alongside, with a comparatively small tonnage offered. Arrivals of British anthracite have not been heavy.

At Philadelphia a strong buying market is once more developing in coke, and many shippers of this fuel are sold up for weeks ahead, and this includes byproduct and beehive, although there is still a fair offering of the latter to be had, but mostly merely crushed and unsized. Anthracite steam coal users while they have received the last of the company storage coal, have not as yet shown any inclination to buy bituminous coal to eke out their supplies, but this seems certain not to be postponed much longer.

While Baltimore anthracite dealers are watching developments in that field with interest, they are pushing the sale of substitutes for hard coal. There is a wide difference of opinion among dealers as to how much of the trade will be regained by the hard-coal interests.

Activity continues in the coke trade at Buffalo, though it has not become as pronounced as was expected. Probably the many reports of an early settlement of the strike have kept people from buying coke to a considerable extent. They want to buy anthracite or they look for coke to be cheaper as soon as the strike is settled, no matter if new-mined anthracite is slow in appearing. The most favorable state of the trade is that coke prices, the real standby in an emergency, have not gone up lately, as was considered likely.

Connellsville Coke Market Firmer

No sooner had most of the uncovered blast furnaces made first-quarter contracts on the recent softening in the coke market (at $3.75 to $4 as reported, but is seems one or two contracts were at under $3.75) than the spot market became very active, partly because of blast furnaces buying extra lots to insure supplies over the holidays but largely by reason of much more Eastern buying.

Yard crushed coke, which had sold at down to $4.25 and then had brought up to $6, has now touched $8, and better prepared coke probably has gone up to $9. The best preparations are hardly obtainable at all.

Regular run-of-oven blast-furnace coke, which a week ago was reportable as advanced from $3.50 to $4, has since gone up to $6, at which there have been bids in the past few days. While blast-furnace interests purchased freely at the lower prices, at least two belated buyers came in last week, paying $5.25 and $5.75 respectively.

Most of about 600 cars loaded on track without destination a short time ago was taken up without much advance in price, and then operators began stiffening sharply in their quotations, getting the advances without difficulty. By this time substantially all the accumulation is taken up, while production is faced with a decrease. Supplies of coke in the East are now quite well worked off and it seems there has to be buying in proportion to the consumption.

Freight Car Loadings

	Cars Loaded	
	All Cars	Coal Cars
Week ended Dec. 12, 1925	1,008,824	191,884
Previous week	1,020,873	191,821
Week ended Dec. 13, 1924	957,424	192,394

Foreign Market And Export News

Bookings and Inquiry Brisk in British Market; Work at Mines Steadier

The British coal market continues steady with traces of firmness in several departments. Collieries are receiving a moderate amount of inquiry over the early part of January. Pits are working more regularly than for several months. The South Wales output has improved to nearly 900,000 tons a week, and prospects are held out of a million-ton level being attained over the next few weeks. French demand is still disappointing, though inquiry tends to expand for later delivery; Italian orders are fairly numerous, and South America is now taking heavy deliveries. Coaling depots are quieter, but there is a moderate movement to the United States, Spain and Portugal.

The prompt market has been much firmer at Newcastle-on-Tyne, thanks to more tonnage being available, and quotations are again more in accordance with actual business. For forward delivery there is quite a healthy demand, but the actual transactions are not so good, as sellers are holding firmly for the current quotations into January. The coke sections, after a slight period of depression, have firmed up wonderfully well, and cargoes are being ordered for the United States as well as for the Continent. This, in conjunction with a better tone in the iron and steel trade, is having a stimulating effect upon coking coals. Gas coals are firm and steady for six weeks ahead. Steams are rather erratic.

Output by British collieries during the week ended Dec. 12, according to a special cable to *Coal Age*, totaled 5,430,000 gross tons, compared with a production of 5,210,000 tons in the preceding week.

Trade Softens All Round At Hampton Roads

Hampton Roads business last week was dull, with prices weakening, and the general holiday laxity falling on the trade. Movement in all directions was comparatively small, and there was a likelihood of continued dullness for two weeks.

Many mines serving this section already have agreed to shut down until Jan. 4, but many factories promise to do the same thing, so the net result is not expected to be a strengthening of the market to any appreciable extent. Shippers reported good surpluses at the mines, and that they expected comparatively light trade until the second week of the new year.

Stronger Industrial Demand In Belgian Market

A very slight improvement in demand for industrial coals has appeared in the Belgian market. This is due to a partial suspension of imports of German fuels and to fears of a general strike if no agreement on the wages of Belgian miners is possible. In the Borinage, coals are still being stocked, but in the other fields there is a slightly better demand.

Sales of house coals, notwithstanding the cold and snowy weather, however, seem to be less active than they were a month ago. This is mostly due to the fact that, since the Belgian coal owners exacted from their French customers payments in Belgian francs instead of French francs, as heretofore, the demand from France for Belgian household fuels has receded.

Industrial and Domestic Trade Active in French Market

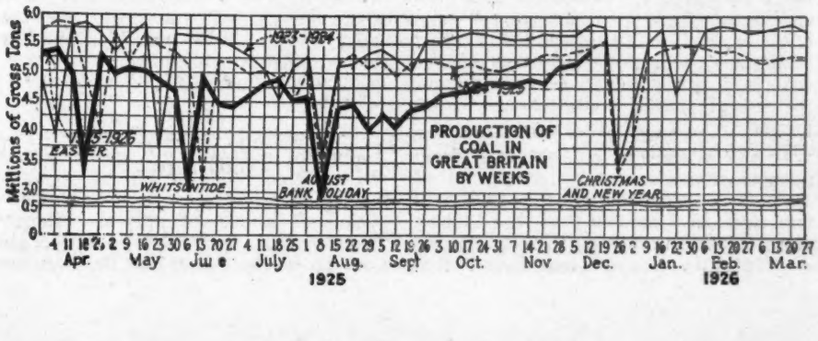
The collieries of the Nord and Pas-de-Calais, in France, are particularly busy; their output of industrial grades is well sold and for household coals their market continues to be marked by the greatest activity.

Since the prices for the sale of Belgian coals in France have been adjusted to take into account the depreciation of French currency compared to the Belgian franc quotations are based on an exchange rate of 100 French francs to 83.15 Belgian francs, with a variation of a few centimes among the various collieries.

Arrivals of empty trucks at the collieries have been more regular of late. Canal freight rates are still high, being quoted on the basis of 28 fr. Bethune-Paris.

Deliveries of indemnity coke from the Ruhr to the O. R. C. A. during the first eight days of December totaled 69,712 tons, or a daily average of 8,090 tons.

The prices of anthracite sized coals delivered by Germany on reparation account have been raised by 10 fr. per ton —the nuts to 220@235 fr., the cobbles to 215@230 fr., according to grade and destinations. The increase went into effect Dec. 16.



Export Clearances, Week Ended Dec. 26, 1925

FROM HAMPTON ROADS

	Tons
For New Brunswick:	
Ital. Str. Vallescura, for St. John....	6,951
For French West Indies:	
Dan. Str. Nordfarer, for Fort de France	5,493
For Jamaica:	
Br. Str. Rowanpark, for Kingston....	2,204
For British West Indies:	
Br. Str. Watsness, for Castries.....	4,212
For Cuba:	
Br. Str. Berwindmoor, for Havana..	9,615
Nor. Str. Bratland, for Cienfuegos..	3,038
Br. Str. Mabay, for Havana.....	2,743
Br. Str. European, for Havana.....	4,694
For West Africa:	
Ital. Str. Delia, for Dakar.....	8,053
For Virgin Islands:	
Nor. Str. Bur, for St. Thomas.....	6,216
For Argentina:	
Dutch Str. Ameland, for Puerto La Plata	4,520
For Porto Rico:	
Amer. Str. Manta, for San Juan....	2,336
FROM PHILADELPHIA	
For Cuba:	
Nor. Str. Sokndal, for Havana.....	——

FROM BALTIMORE

For Hawaii:	
Am. Str. Wm. A. McKenny, for Honolulu, Hawaii	——
For Cuba:	
Br. Str. Maidenhead, for Daiquiri (coke)	——

Hampton Roads Coal Dumpings*

(In Gross Tons)

	Dec. 17	Dec. 24
N. & W. Piers, Lamberts Pt.:		
Tons dumped for week....	140,533	146,756
Virginian Piers, Sewalls Pt.:		
Tons dumped for week...	113,545	104,621
C. & O. Piers, Newport News:		
Tons dumped for week..	154,098	146,921

*Data on cars on hand, tonnage on hand and tonnage waiting withheld due to shippers' protest.

Pier and Bunker Prices, Gross Tons

	Dec. 19	Dec. 26†
PIERS		
Pool 1, New York....	$5.75@$6.00	$5.75@$6.00
Pool 9, New York....	5.10@ 5.30	5.10@ 5.30
Pool 10, New York....	4.80@ 5.15	4.80@ 5.15
Pool 11, New York....	4.55@ 4.75	4.55@ 4.75
Pool 9, Philadelphia..	5.05@ 5.30	5.05@ 5.30
Pool 10, Philadelphia..	4.80@ 5.10	4.80@ 5.10
Pool 11, Philadelphia..	4.50@ 4.75	4.50@ 4.75
Pool 1, Hamp. Roads..	4.85@ 4.95	*4.75@ 4.85*
Pool 2, Hamp. Roads.	4.75@ 4.80	*4.50@ 4.60*
Pools 5-6-7, Hamp. Rds.	4.50@ 4.55	*4.30@ 4.40*
BUNKERS		
Pool 1, New York....	$6.00@$6.25	$6.00@$6.25
Pool 9, New York....	5.35@ 5.55	5.35@ 5.55
Pool 10, New York....	5.05@ 5.40	5.05@ 5.40
Pool 11, New York....	4.80@ 5.00	4.80@ 5.00
Pool 9, Philadelphia..	5.30@ 5.55	5.30@ 5.55
Pool 10, Philadelphia..	5.10@ 5.35	5.10@ 5.35
Pool 11, Philadelphia..	4.75@ 5.00	4.75@ 5.00
Pool 1, Hamp. Roads.	4.95	*4.85*
Pool 2, Hamp. Roads.	4.80	*4.60*
Pools 5-6-7, Hamp. Rds.	4.55	*4.30@ 4.40*

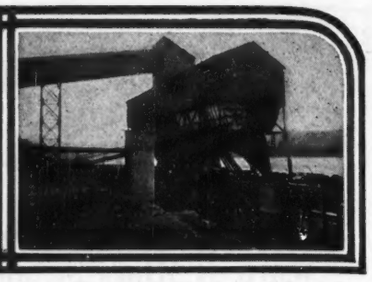
Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations by Cable to *Coal Age*

Cardiff:	Dec. 19	Dec. 26†
Admiralty, large.....	23s.@23s.6d.	*22s.6d.@23s.6d*
Steam smalls.....	13s. 6d.	13s.6d.
Newcastle:		
Best steams.....	15s.3d.	**15s.3d.@18s.**
Best gas.....	16s.6d.	16s.6d.
Best bunkers.....	16s.6d.	*15s.6d.@16s.6d*

† Advances over previous week shown in **heavy type**; declines in *italics*.

News Items From Field and Trade



ALABAMA

The Gulf States Steel Co., of Birmingham, is reported to have acquired 36,000 acres of coal land in Tuscaloosa County, near Gadsden, which it will develop.

ILLINOIS

A. E. Lewis, of Worden, has been elected Madison County mine inspector for another year. The Board of County Supervisors voted unanimously for Lewis' retention in his post. No other application for the job was received.

The Black Star Coal Co. resumed work early in December at its mine at Logan, in the vicinity of Benton, after an idleness of several months.

William Haywood, top foreman at the Indiana & Illinois Coal Corporation's mine No. 10, Nokomis, has been appointed Assistant Director of Mines and Minerals of Illinois. Mr. Haywood was for a number of years assistant general superintendent of the Indiana & Illinois corporation mines near Nokomis.

INDIANA

American No. 1 mine near Bicknell has resumed operations. It has been down since Nov. 20 when thirty trip riders and motormen went on strike unauthorized by the United Mine Workers. The strike forced 500 other men to quit work. The trouble was caused by the refusal of the mine boss to return one trip rider to work after the man had threatened the boss's life with a revolver in a dispute over working conditions.

The Patoka Coal Co. will begin operations on the Harris lease near Petersburg soon. The company has purchased a railroad locomotive and other equipment to aid in moving the mined coal to spur lines.

A suit involving $7,000,000 worth of coal was filed in Pike County Circuit Court at Petersburg, Dec. 17, by the Mercantile Commercial Bank of Evansville, receiver of the Vulcan Coal Co. The suit asks that property that formerly belonged to the Vulcan company he returned to the receiver, that the transfers made from the Vulcan company to the Southwestern Indiana Coal Corp. be set aside and that the contract between the corporation and the Enos Coal Co. be annulled. Former stockholders of the Vulcan company allege that the transfer of property from that company to the Southwestern Indiana corporation was irregular. Property involved includes some of the most valuable coal stripping lands in southwestern Indiana.

A new production record for one week for southern Indiana shaft mines was set by Francisco Mine No. 2, near Princeton, in the week ended Dec. 19, when 12,487 tons of coal was hoisted, an average of 2,081 tons per day. The coal was loaded into 232 railroad cars. The mine now employs 350 men and has a monthly payroll of $60,000.

IOWA

Peace reigns again between members of the Des Moines local of the United Mine Workers, district No. 13, and the executive board of the district following a fortnight of what several Des Moines miners characterized as "enmity." Members of the district gave a vote of confidence to their officials after several hours' discussion of the agreement between the Hartford mine management and themselves.

A 7-ft. seam of high-grade coal recently was discovered near Odebolt while drilling a test oil well. The coal was found at a depth of 498 ft. under 27 ft. of cap rock and 12 ft. of shale.

KANSAS

The Black Diamond Coal Co., of Pittsburg, has applied for a Kansas charter. The capitalization is $10,000. The incorporators are H. J. Feiden, R. D. Wilson, Walter Bennett and William Whetstone, all of Pittsburg. They recently opened a small deep mine two miles east of Pittsburg and have purchased an additional lease for sinking another mine.

Ira Clemens, one of the leading coal operators of the southeastern Kansas field prophesied in an address before the United Commercial Travelers at Pittsburg recently that within less than a half century coal will be pulverized at the mines near Pittsburg and blown to Kansas City through pipe lines for fuel for steel mills and other industrial plants. Small electric generating plants to burn Kansas coal will dot the field, he believes. With new methods close to 100 per cent of the coal in a working will be brought out instead of the present average of 65 per cent.

Unofficial figures, but obtained from authoritative sources, indicate that Kansas coal production for 1925 will run close to 6,000,000 tons, the largest since 1920. In addition to these figures a "statistics hound" has found that since 1884, the first year in which output reached 1,000,000 tons, the Kansas field has marketed 182,600,914 tons of coal, exclusive of the current year. The first official record of coal production was in 1869, when the output was 36,891 tons. The production peak was reached during the World War, when 7,250,000 tons was mined in 1917 and again in 1918. In 1919, 5,400,312 tons was produced; 1920, 6,130,341 tons; 1921, 4,028,624 tons; 1922, 3,518,243 tons; 1923, 4,650,478 tons; 1924, 4,491,069 tons.

KENTUCKY

On Christmas eve James Hatcher, of the James Hatcher Coal Co. at Big Shoal, five miles below Pikeville, presented to each of his 400 miners a box of candy.

The Red Star Coal Co., Whitesburg, has leased 50 acres of land and will develop it.

The West Kentucky Coal Co., Sturgis, a subsidiary of the North American Co., expects in the near future to construct a power transmission line approximately 40 miles long, to join its Earlington power plant with the Sturgis power plant.

MINNESOTA

The city ordinance of Minneapolis forbids the use of other than smokeless coal in railroad locomotives, but it has seldom been enforced in any degree. Now it is proposed to amend the ordinance to permit the use of other grades, but with time limits as to the extent and amount of dense smoke. Railroad men have insisted that they could not use smokeless in locomotives.

NORTH DAKOTA

Records on North Dakota lignite shipments filed with the state railroad board of that state, show a growing market for it. In the week ending Oct. 24, 1924, 26,647 tons was shipped within the state and 2,854 tons shipped outside the state. For the corresponding week of 1925 the shipments within the state had grown to 43,155 tons and the outside shipments to 4,308 tons.

OHIO

More of a feeling of optimism pervades the coal field of Jefferson County in view of recent developments, after a period of about 18 months' idleness. The large mines of the United States Coal Co. at Plum Run and Bradley have

resumed operations with reasonable expectation that they will be operating at capacity before long. Improvement is in evidence also at the mines of the Jefferson Coal Co. at Piney Fork. The Y. & O. mine at Glen Robbins is operating once again, as is the Clarkson mine at Dunglen. The Hanna mines at Dunglen are in operation once again and the New Pittsburgh mines at Ramsey and Rhodesdale are increasing their output. It is noticeable that the deep mining operations are improving to a greater extent than the stripping.

Nine men died in the Webb mine of the Cambria Collieries Co. the night of Dec. 22 after a rock fall had brought down a feeder line, causing a short-circuit that ignited a body of gas. Two more men were overcome and rushed to a hospital at Bellaire. Fire followed the blast. Only 79 men were in the mine at the time.

Improvements which will greatly increase output are now under way at the stripping mines which the Harmeyford Coal Co. recently purchased from the Kehota Mining Co. in the heart of the Hocking Valley. A new tipple and track will be put in at Baird's Furnace, New Straitsville, and when they are completed a million tons of 10-ft. coal will be opened up. The other mines are the Saltillo plant, near Redfield, and the McCuneville mine, near Shawnee. The Harmeyford company was formed when the organization took over the Kethota property. The name is coined from the names of the officers of the company: William S. Harman, of Columbus, president; John Winefordner, Zanesville, vice-president, and E. R. Meyer, of Zanesville, secretary-treasurer. The field operations are under the direction of Mr. Winefordner. The company has an acreage of 2,500, the property being worth $1,500,000. The output is now 2,000 tons a day.

PENNSYLVANIA

After a meeting of the board of directors of the Lehigh Valley Coal Co. on Dec. 22 it was announced that the regular dividend of the company had been declared. An initial dividend of $1.25 was declared a year ago and another of $1.25 was declared last June, presumably placing the stock on a $2.50 annual basis.

The Snowdon Coke Co., of Pittsburgh, has contracted with the Marion Machine, Foundry & Supply Co., of Scottdale, for the erection of a coke crushing and screening plant for the sizing and preparation of coke. Heretofore this company has not shipped any coal or prepared sizes of coke, confining its activities to the production of furnace and foundry coke.

Coke having taken a new lease of life, the H. C. Frick Coke Co. has fired up the Davidson plant, with 200 ovens, which had been idle for the last two years. The Franklin Coke Co. has resumed operations at its 30-oven plant at Tippecanoe, after several weeks' idleness. The Stern Coal & Coke Co., which banked its 132 ovens a few weeks ago, also has resumed.

C. E. Cowan, of Greensburg, chief engineer of the Jamison Coal & Coke Co., has been appointed consulting engineer of new construction work by the Snowdon Coke Co. at its Mt. Hope plant, at Linn, near Brownsville.

More than 100 men interested in industry in the Monongahela River district, including coal companies and steel concerns, were present at a hearing before the U. S. Engineer at Pittsburgh Dec. 23, in an effort to persuade the engineer not to recommend the abandonment of the proposed canalization project in the Youghiogheny River. The movement to keep the canalization project a live issue was started by the Pittsburgh Coal Co., which has large coal deposits along the Youghiogheny.

The Pittsburgh Coal Co. last week evicted ten families from their houses at the Montour No. 10 mine, at Library. The statement of the company said the men were indebted for six months' rent and that the houses were needed for men who were at work.

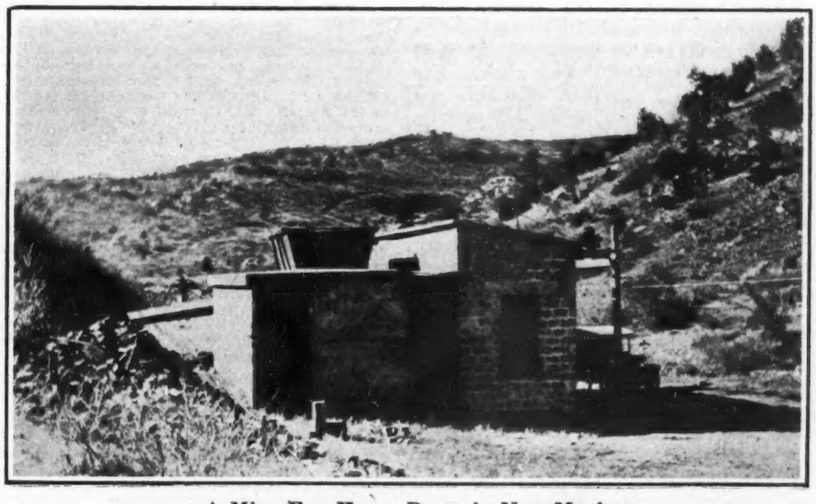
The Rich Hill mine of the McClane Mining Co., at Canonsburg, is operating with about 25 per cent of its 450 men at work under the Jacksonville agreement, according to a statement by W. H. McClane. The company is only having some cleaning up done and some coal recovered that would otherwise be lost. Future operation, it was said, would depend on market development and other things.

After serving for 65 years in various capacities in the anthracite mining industry, John Harvey, of Hazelton, recently stepped down as a member of the Taxpayers Association of Hazelton. The association is composed of anthracite mining companies and for years has been administering the road taxes in Hazelton, Foster and Banks Township. Mr. Harvey started as a breaker boy in the mines of the Hazelton field and for 29 years was superintendent of the Coleraine mine. John Crooks, superintendent of the Lattimer mines, has been named to succeed Mr. Harvey as president of the association; A. B. Jessup, of the Jeddo-Highland Coal Co., has been named vice-president, and Scott Young, real estate agent for the Lehigh Valley Coal Co., will continue as secretary of the organization.

Two hundred miners employed at the mines of the Superior Coal Co. near Cheswick went back to work last week with the reopening of the mine, which was closed two weeks as a result of a cave-in in the shaft.

Pittsburgh and western Pennsylvania labor organizations will be assessed a portion of their wages on Jan. 7 to assist the striking anthracite and bituminous miners of Pennsylvania, it has been announced by P. T. Fagan, president of District No. 5, United Mine Workers. This is a result of the action taken by the American Federation of Labor, when William Green, president, made an appeal for funds.

Approximately 70,000 1-lb. boxes of candy were distributed during Christmas week by the Union Supply Co. at the mining plants of the H. C. Frick Coke Co. A "treat" to children of employees was given generally on Thursday.



A Mine Fan House Down in New Mexico

A part of the ventilation plant at Mine No. 6 of the Phelps-Dodge Corp., located at Dawson, N. M. This housing represents a high type of construction by a company which pays particular attention to its ventilation problems.

WASHINGTON

Five underground men were killed and several overcome by carbon monoxide following a dust explosion in the Wilkeson Coal & Coke Co. mine in Wilkeson, Dec. 14. The explosion followed a shot to dislodge a boulder that had choked a steeply pitching chute. The report of Chief Mine Inspector William Reese shows that Assistant Foreman C. E. Farrell, who helped place the stick of dynamite on top of the boulder and mud it in according to the prevailing custom in "bulldozing" rocks, had tested for gas and found none before he lit the fuse and retreated. However, an explosion swept through part of the mine. There were evidences of coal dust in the section and Mr. Reese attributes the spread of the blast to that, although "the floors and walls of the crosscuts showed dampness and moisture, and, particularly in one crosscut, pools of water lay on the floor."

WEST VIRGINIA

Dakota mine No. 41 of the Bethlehem Mines Corp. loaded 1,984 net tons of coal Dec. 22, a new record for 110 men employed at the plant.

"The Coal Smellers," an organization of officials of the J. H. Weaver coal interests in West Virginia, and their guests attended a banquet at the Waldo Hotel in Clarksburg, Dec. 19. More than forty-five employees of the Weaver mines in West Virginia—at Dawson, Rose Hill and Ironia—were present. James A. Jenkins, general superintendent, was the guest of honor, and F. M. McDaniel, of Clarksburg, was toastmaster. Among those who spoke at the banquet were Charles B. Johnson, Dr. H. A. Rosenthal and Dr. W. A. Thomason, of Clarksburg; Ralph H. Ely of Buchannon; E. D. Lyle of the New York Central R.R., R. E. Rankin, W. H. Schmeltzer and A. M. Grase of Pittsburgh, Pa., representing the Goodman Manufacturing Co., and G. L. Pettrey and Frank Haller of the Clarksburg Candy Co.

On Dec. 22 Governor Howard M. Gore of West Virginia announced the reappointment of Robert M. Lambie as chief of the state department of mines of West Virginia for the term of four years beginning Jan. 1. Mr. Lambie became head of the department of mines Feb. 14, 1920. He was appointed by former Governor John J. Cornwell to succeed W. J. Heatherman. The legislature early this year increased his salary from $5,000 to $6,000.

The Lanark Fuel Co., having equipped its mine with a new tipple and outdoor conveyor system, resumed operations on Monday, Dec. 21, after several months' inactivity. The company's tipple burned last March. Production is expected to reach 300 tons a day. Coal will be mined not only in the Sewell vein but in the Beckley seam as well.

P. J. McGraw, superintendent of Federal mine No. 1, at Grant Town, who recently removed to Fairmont, was presented with a gold watch on Dec. 17 by a number of workers.

On Dec. 19 for the first time in its history, the Baltimore & Ohio R.R. moved a mallet train out of the Fairmont yards over the Connellsville division. Sixty-five cars of coal were moved over the "Sheepskin." Mallet trains are almost exclusively run between Fairmont and the Keyser scales over the Alleghany Mountains, east of Grafton.

The Island Creek Coal Co. has awarded a contract to the Winter Homes Corp. of Huntington for the construction of 165 miners' houses at Holden. This is said to be one of the largest contracts for the construction of miners' dwellings which has been let in the state for several years.

The National Coal Mining Co., of Pittsburgh, Pa., has sold the Pollar mine in Lewis County, between Clarksburg and Weston, near McWhorter, to a company being formed by John P. Whelan, formerly of Cleveland, and at one time general superintendent of the Brady-Warner Coal Corp. plants. There are 1,400 acres of Pittsburgh and Redstone coal in the tract. The mine will be reopened about Jan. 15.

The Whyel Coke Co. with main offices at Uniontown, Pa., has sold Yukon mine, at Arnettsville, Monongalia County, to the Imperial Coal Corp. of New York City, for $1,000,000. The property has 2,000 acres of Pittsburgh coal and the company's present capacity is 1,000 tons a day. The new owners, it is said, will increase their daily capacity to 2,500 tons.

ALASKA

Candle Creek lignite mine is producing 25,000 tons a year from a seam 88 ft. thick. Healy River Coal Co. has contracted to supply 25,000 tons a year to Fairbanks dredges. The Evan Jones mine, at Matanuska, has contracted for 150 tons a day to the Alaska Ry. Howard-Jensen mine started production in September and is supplying coal to coast points. The Alaska-Pacific Coal Co. has arranged to complete the Katalla Ry. and ship coal to Pacific Coast points.

CANADA

T. M. Molloy, Commissioner of Labor and Industries for Saskatchewan and a member of the Lignite Board of Canada, has returned from a two months trip to Europe, the object of which was to have Saskatchewan coal tested in various types of carbonizers. He had tests made in three carbonizers in England, three in Germany and one in Czechoslovakia with a view of ascertaining by which method the best results could be obtained. Some of the tests brought out large quantities of tar and others oil. While in England, Mr. Molloy had the hearty co-operation of all British Research officials.

Word has been received at Regina, Sask., that large-scale briquetting tests conducted in Germany last summer with lignite from southeastern Saskatchewan have proved a technical success. Whether or not this means that the German process will be adopted in Canada will not be known until final results are studied. The report has been received by W. D. Worcester, a professor of Saskatchewan University, who was sent to Germany last summer in charge of 52 tons of lignite from the Taylorton district. The tests were conducted by Thyssen and Co. at Malheim-Ruby, and the Lurgi Co. at Frankfort.

Traffic

Hearing on Coke Rate Changes

The Coal, Coke & Iron Ore Committee, Central Freight Association territory, will hold a hearing in room 606 Chamber of Commerce Building, Pittsburgh, Pa., Jan. 7, 1926, at 10 a.m., on proposed changes in rates on coke, coke breeze, coke dust and coke screenings (the direct products of coal) from Ashland, Ky.; New Boston, Portsmouth and Ironton, Ohio, to stations in Michigan.. The changes cover advances and reductions to bring about a proper relation with rates via all routes and with rates from other districts. Details of the proposed changes will be furnished promptly by the committee upon request.

Seek Removal of Differential Against Ohio

The state of Ohio will join the Ohio coal operators in asking the Interstate Commerce Commission to reconsider its decision sustaining a differential freight rate schedule, favoring West Virginia and Kentucky over Ohio mining operations. An announcement to this effect recently was made by Attorney General C. C. Crabbe of Ohio. H. H. Griswold, First Assistant Attorney General, and John W. Bricker, special counsel in the office of the Attorney General, will act as special counsel in the case. The Attorney General's announcement was made following a conference with D. F. Hurd, Cleveland, and E. S. Ballard, Chicago, counsel for the Pittsburgh Vein Operators' Association of Ohio.

The Kalbaugh Coal Co., of Cumberland, Md., has made application to the Interstate Commerce Commission to have its rate on eastern coal shipments reduced. The concern operates a mine at Barnum, near Piedmont, Mineral County, W. Va., and it asks the commission for a lower rate than the mines further west, because the Baltimore, & Ohio R.R. does not have the expense of hauling its product over the Alleghany Mountains. At present all the mines of the Preston County fields, which include Tunnelton and other sections have the so-called Myersdale rate, which is 25c. less than the Fairmont rate. An Interstate Commerce Commission examiner will hear the application in Cumberland, Md., on Feb. 4.

Obituary

James R. Thomas, 65, president of the Carbon Fuel Co., Cincinnati, Ohio, died Dec. 27 at his home in Charleston, W. Va. He was widely known in coal circles in Cincinnati, where he was a member of the Queen City Club and other organizations. In the late eighties he became purchasing agent for the Mt. Carbon Coal Co. and acquired holdings on Cabin Creek, which later were to be the scene of much coal activity. About twenty-five years ago he, with A. E. Humphries planned and built the long spur of railway line up Cabin Creek, which was connected with the Chesapeake & Ohio lines at Leeward. Through this Mr. Thomas was able to open and develop the coal lands which he owned on Cabin Creek. In order to market the product of this and other mining properties in the Kanawha fields the Kanawha Coal Co. was organized with main offices at Cincinnati. This selling organization was maintained until about twenty years ago, when Mr. Thomas established the Carbon Fuel Co.

Andrew Cattanach, for 35 years connected with the coal trade in the Twin Cities, died recently at his home in Minneapolis, Minn., aged 65 years. He was first connected with the C. G. Lewis Coal Co. in St. Paul. The business was afterward purchased by the Philadelphia & Reading Coal & Iron Co. and he remained with that company in varying capacities for a number of years. About five years ago he was made cashier of the Minneapolis office. The widow, a brother and three sisters survive.

Coming Meetings

Chicago Wholesale Coal Shippers' Association. Annual meeting, Great Northern Hotel, Chicago, Ill., Jan. 6, 1926. Secretary, G. H. Merryweather, Temple Bldg., Chicago, Ill.

American Wood Preservers' Association. Annual meeting, Jan. 26-28, 1926, at Cleveland, Ohio. Secretary, E. J. Stocking, Chicago, Ill.

Coal Club of Philadelphia. Annual meeting, Jan. 28, 1926, at the Bellevue-Stratford Hotel, Philadelphia, Pa. Secretary, C. K. Scull, Philadelphia, Pa.

Northeast Kentucky Coal Association. Annual meeting, Jan. 28, 1926, at Ventura Hotel, Ashland, Ky. Secretary, C. J. Neekamp, Ashland, Ky.

American Institute of Electrical Engineers. Annual convention, Feb. 8-12, 1926, at Engineering Societies Bldg., New York City. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

American Institute of Mining and Metallurgical Engineers. Annual meeting, Feb. 15-17, 1926, at Engineering Societies' Building, New York City. Secretary, Dr. H. Foster Bain, 29 West 39th St., New York.

The Rocky Mountain Mining Institute. Winter meeting, Feb. 23-25, 1926, at Albany Hotel, Denver, Colo. Secretary, Benedict Shubart, Boston Building, Denver, Colo.

New Companies

The Cedar Coal Co. was incorporated in Canon City, Colo., early this month, with a capital stock of $20,000, by B. M. Narron, Wm. Starret and P. Westwater.

The Widwest Coal Co. was incorporated in Colorado the first week in December, with a capital of $25,000, by S. W. Ackerman, of Grand Junction, and J. S. Chayney, N. Richards and D. Moschetti, of Palisades.

The Westerik & Folkerts Coal Co. was incorporated in Denver, Colo., the first part of December, with a capital of 50,000 shares of no par value by G. J. B. Westerik, P. S. Van Cise and others.

The A. W. Hall Coal & Oil Co. was incorporated in Denver, Colo., early in December, with a capital stock of 500 shares of no par value, by A. M. McNeil, F. A. Wachob and A. W. Hall.

The Copen Creek Coal Mines, Inc., has been organized with a capital of $10,000 to operate at Copen, in the Braxton County field of West Virginia. Chiefly interested in the new concern are C. W. Flesher, Mary E. Flesher, Lucille Flesher, all of Gassaway, and J. K. Favison and J. K. Tosh, of Bower, W. Va.

Association Activities

The annual meeting of the **Hazard Coal Operators' Exchange** will be held at Lexington, Ky., on Jan. 22, with a business meeting in the daytime and a banquet in the evening.

The annual meeting of the **New River Coal Operators Association,** held at Mount Hope, W. Va., Dec. 17, was attended by more than 100 operators. The officers' reports showed the organization in a flourishing condition. M. L. Garvey, general manager, Maryland-New River Coal Co., Winona, W. Va., was elected president; William McKell, vice-president; P. M. Snyder, treasurer, and S. C. Higgins, secretary and traffic manager. The executive committee chosen was as follows: G. H. Caperton, president of the New River Coal Co., Charleston; S. A. Scott, vice-president, New River Coal Co., MacDonald, W. Va.; William McKell, president, McKell Coal & Coke Co., Glen Jean, W. Va.; Ernest Chilson, vice-president and general manager, Raleigh Coal & Coke Co., Raleigh, W. Va.; R. E. Taggart, vice-president, Stonega Coke & Coal Co., Big Stone Gap, Va.; P. M. Snyder, president, Long Branch Coal Co., Mount Hope, and President Garvey. A general discussion of roads followed, during which it was decided that a large delegation representing the association—which in turn represents the heaviest tax payers in that section of the state—should wait upon the road commission with a definite plan of suggestions regarding the designation and building of much needed public highways for the whole southeastern part of West Virginia.

New Equipment

Combined Hanger Increases Circuit Efficiency

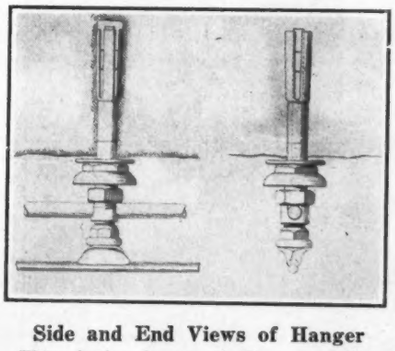
Necessity, justly famed as the mother of invention, not infrequently proves herself the grandmother of economy. Such was the case with the combined trolley and feeder-cable hanger shown in the accompanying illustration, which is the invention of C. E. Rogers, chief electrician of the Logan division of the West Virginia Coal & Coke Co., and which is being placed on the market by the Guyan Machine Shops.

Carrying the feeder cable along the side of the entry and joining it to the trolley outlet at considerable intervals introduces many disadvantageous features. Thus an appreciable difference may exist between the potentials of the wire and feeder while a jumping trolley may break the connection between the two. A side feeder also entails a separate line of supports and insulators with their necessary expense of insulation and upkeep.

In this new hanger the lower part or element is similar to that of the ordinary type being fitted with the usual jaws to grip the grooved trolley wire. The upper end of this element, however, is split or forked to receive the feeder. This is here inserted and the tightening of the nut binds the feeder in place and bonds it electrically to the trolley. The size of the feeder employed may range anywhere from a 4/0 wire to a 500,000-circ.mil cable. Either, or any intermediate size can be held securely.

Lowers Costs, Increases Safety

By the use of a hanger such as this only one line of insulators and supports is used in a heading, the cost both of installation and upkeep being proportionately decreased. There is no danger of the connection between feeder and trolley wire being broken by contact with a "wild" trolley wheel or pole. Furthermore, the feeder and trolley are connected at frequent intervals assuring that both will be at practically the same potential at all points along their course.



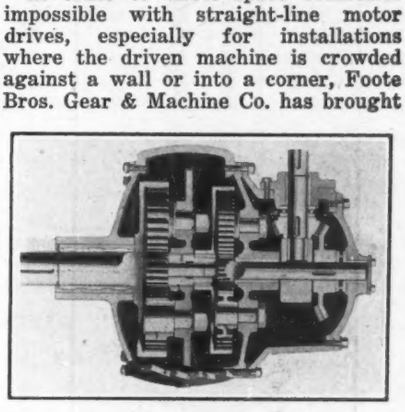
Side and End Views of Hanger

This device is practically an ordinary trolley hanger with added provision for supporting a feeder cable above it. The arrangement is such that a line of these hangers may be put in place without taking down or even seriously disturbing the trolley. If either trolley or feeder line becomes slack through stretching or otherwise they may be tightened both quickly and easily.

Most locomotive drivers blame the return for all the ills of low voltage. As a matter of fact the positive side of the circuit in many instances is quite as truly responsible for the low potential at the point where electrical energy is applied as is the negative. It is just as important, therefore, to reduce the losses in the trolley and feeder lines as in the rails. Efficiently copper-bonding the rails is not in itself enough to prevent severe electrical losses with their attendant evils. Over six miles of this kind of electrical construction has been installed during the past few months and is giving excellent satisfaction.

New Right-Angle Drive Spur Reducers Save Space

In order to effect space economies impossible with straight-line motor drives, especially for installations where the driven machine is crowded against a wall or into a corner, Foote Bros. Gear & Machine Co. has brought out a new line of IXL right-angle drive spur reducers.



It Is a Compact Unit

This cut-away view of the new speed reducer shows the arrangement of gears and shafts—especially the bevel pinions at the high speed end—which permit of right-angle drive for tight corners where there is no space for straight-line mounting of the motor.

The new unit is similar in exterior appearance to the company's standard straight-line drive speed reducers, except that the high speed and low speed shafts project through the case at right angles to each other. This change in direction is accomplished by means of bevel or mitre gears mounted in the high speed end of the unit. A secondary bevel or mitre gear is mounted on the high speed driving shaft which is concentric with the low speed shaft.

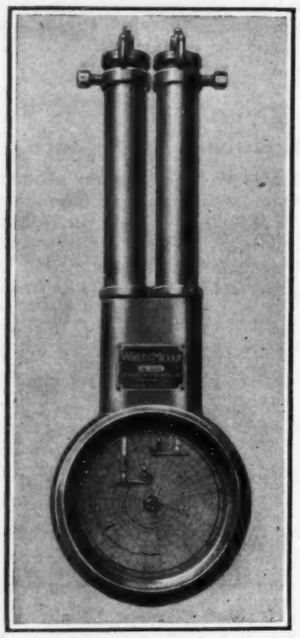
The high speed pinion is integral with the high speed shaft and delivers the power through three idler gears set at 120-deg. angles to a large rotating integral gear. The internal gear is securely fastened to the slow speed shaft. The high speed pinion, together with the idlers, internal gear and slow speed shaft comprise the entire mechanism for a single reduction

train which can be repeated in obtaining greater reduction ratios.

By changing the size of the pinion and internal gear and the relative size of the bevel gears in the high speed end, almost any desired relation may be obtained between the speeds of the two shafts. The manufacturers produce these right angle spur reducers in a large variety of standard sizes and reduction ratios, horsepowers ranging up to 150-hp. and reduction ratios up to 350 to 1.

Waste Meter Continuously Indicates Boiler Losses

In any boiler plant the greatest loss sustained is that of the hot gases going up the stack. In order to measure accurately this loss the Uehling Instrument Co., of Paterson, N. J., recently has placed on the market a recording



Shows Heat Losses

This little instrument continuously indicates both the temperature of the flue gases and their content of carbon dioxide. A constant visual index is thus afforded the fireman of the conditions existing within the furnace.

instrument known as a waste meter and shown in the accompanying illustration. This records both the temperature of the escaping flue gas and its content of carbon dioxide on the same chart. The corresponding loss may be read from a table furnished by the manufacturer.

Reduction of chimney losses involves both a decrease in temperature and an increase in the content of carbon dioxide of the products of combustion. With the aid of an instrument of this kind it is an easy matter for the fireman to control the air supply and to make the stack loss a minimum. This instrument embodies both a pyrometer and a gas analysis element.

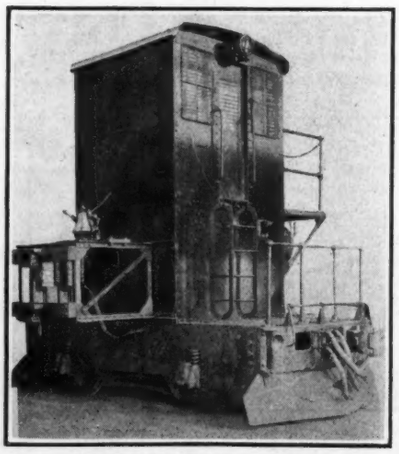
The pyrometric element works on the principle that any change in temperature of the flue gases will make a corresponding difference in the pressure of vacuum existing in a chamber into which flue gases at constant temperature and at actual stack temperature pour through two orifices under the action of a constant suction.

The gas analysis element is similar to that recording temperatures except that the gas is passed through a dry cartridge that absorbs the carbon dioxide. By these means two pens are actuated upon a single circular chart and both the temperatures and carbon dioxide content of the flue gases continuously recorded. Careful manipulation of the drafts is particularly necessary during peak load periods because at that time losses both from temperature and excess air are liable to be most severe. Visual indication of conditions existing in the furnace and boiler, made possible by the use of this instrument, do much to rectify errors in air supply and increase the overall efficiency of the entire equipment.

High Locomotive Facilitates Coke Quenching

In the accompanying illustration may be seen a new type of locomotive recently placed on the market by the General Electric Co., of Schenectady, N. Y. This machine is intended for handling quenching cars in byproduct coke yards, particularly for transporting hot coke from the ovens to the quenching tower.

This locomotive is especially designed to facilitate these operations. A platform on the side enables the driver to leave his inclosed cab for purposes of observation. The cab itself is of the double-deck type and may be lined with asbestos as a protection from the heat of the ovens and coke. The projection or arm on the left side, upon which the bell is mounted, is the third rail collector, the third rail used at coke plants being usually suspended above rather than laid along the ground as in elevated and interurban lines. The locomotive is supplied with air-brake equipment, the pump also being used to supply air to the dumping mechanism on the quenching car.



High Enough for Good Observation

On the left is the arm carrying the shoes that collect current from the third rail. A slightly higher platform on the right serves for purposes of observation. The air pump not only furnishes air for the operation of the brakes but for the dumping mechanism on the quenching car as well.

Publications Received

The Industrial Museum, by Charles R. Richards. The Macmillan Co., New York City. Pp. 117; 6 x 9¼ in.; illustrated. Price, $3. A plea for the establishment of industrial museums in America. The author describes his trip to the four great European industrial museums in Paris, London, Munich and Vienna.

Factors Affecting Production of Lump Coal, by J. E. Tiffany and B. L. Lubelsky. Coal mining Investigations under auspices of Carnegie Institute of Technology, U. S. Bureau of Mines and Advisory Board of Coal Mine Operators and Engineers. Bulletin 19. Pp. 94; 6 x 9 in.; illustrated. Price, $1.

Mechanical Safeguarads in Rotary Drilling, by H. C. Miller. Bureau of Mines, Washington, D. C. Technical Paper 369. Pp. 38; 6 x 9 in.; illustrated. Price, 10c.

Coal-Dust Explosions: The Effect of Release of Pressure on Their Development, by H. P. Greenwald and R. V. Wheeler. Safety in Mines Research Board, Paper No. 14. H. M. Stationery Office, Kingsway, London, England. Pp. 12; 6 x 9½ in.; illustrated. Price, 3s. net.

Mechanical World Year Book, 1926. Emmott & Co., Ltd., Manchester, England. Price, 36c. Pp. 348; 4x6 in.; illustrated. New features introduced in this edition are sections on the Uniflow Engine, Fuel Economizers, Notes on Grinding, etc.

A Study of Skip Hoisting at Illinois Coal Mines, by Arthur J. Hoskin. Prepared under a co-operative agreement between the Engineering Experiment Station of the University of Illinois, the Illinois State Geological Survey and the U. S. Bureau of Mines. Price, 35c. Bulletin No. 151. Pp. 66; 6x9 in.; illustrated. Describes the results of an investigation into the advantage claimed for skip hoisting.

Fifth Annual Report of the Federal Power Commission: 1925, Washington, D. C. Pp. 209; 6x9 in.; parts I and II.

Report of the Mining Engineer and Agent of the Girard Estate in Schuylkill and Columbia Counties, Pennsylvania, for the Year 1924. Pp. 56; 6x9 in.; tables.

Coal Statistics for Canada for the Calendar Year 1924. Dominion Bureau of Statistics, Ottawa, Canada. Pp. 96; 6½x9½ in.; tables.

The Support of Underground Workings in the Coal Fields of Scotland. Safety in Mines Research Board Paper No. 12, H. M. Stationary Office, Adastral House, Kingsway, London, England. Pp. 24; 6x9½ in.

Trade Literature

Cleveland Worms and Gears. The Cleveland Worm & Gear Co., Cleveland, Ohio. Bulletin No. 105. Pp. 15; 8x11 in.; illustrated. Dimension tables and drawings of standard gears and worm mountings are included, together with a list of gear ratios available on standard centers.

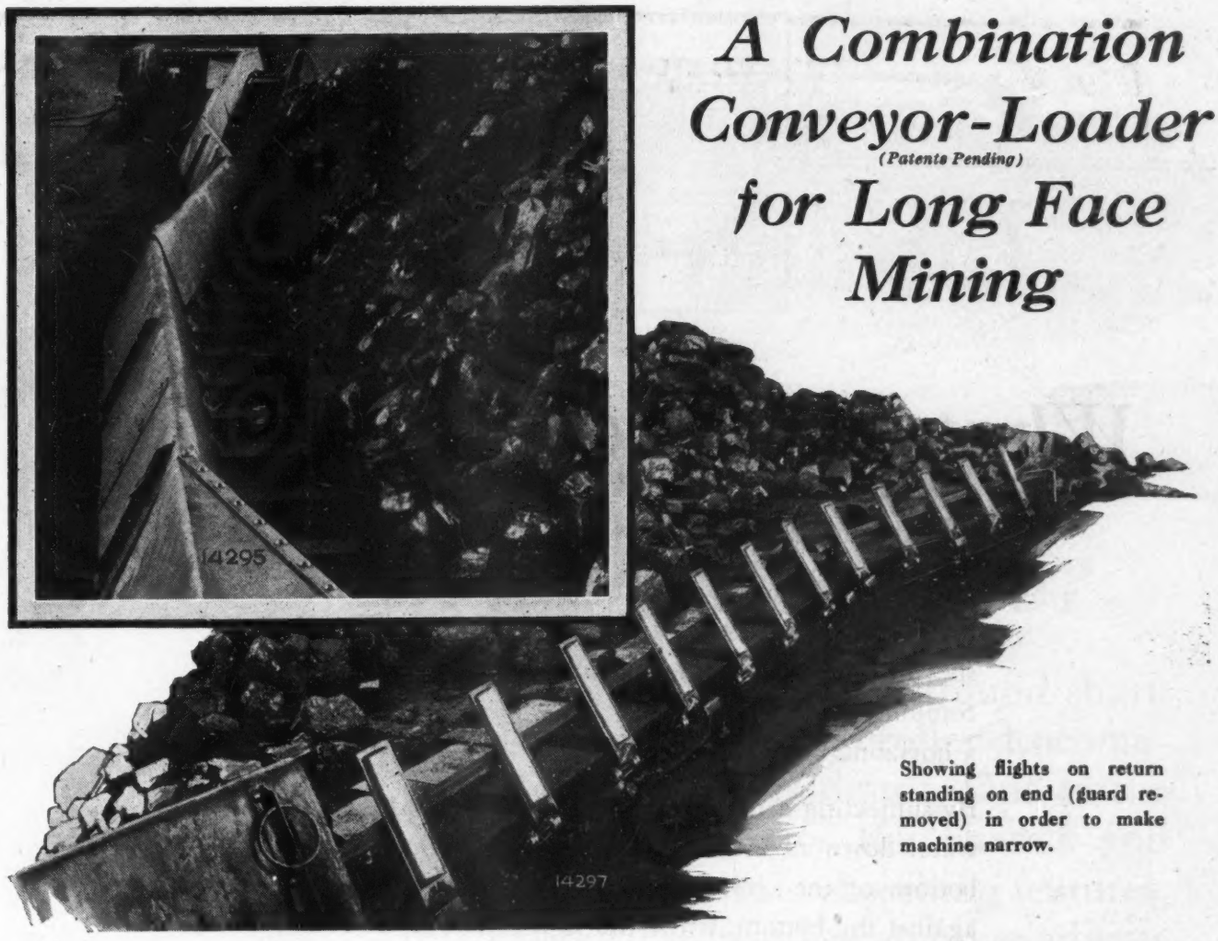
Industrial Control Catalog. General Electric Co., Schenectady, N. Y. Catalog 6001B, superseding all previous catalogs, with the exception of those dealing with railway, mine and industrial supplies and merchandise products. Pp. 1100; 8x10½ in.; illustrated. The catalog is thumb-indexed into 16 sections, some of which cover generation, wire and cable, distribution transformers, arresters, voltage regulators, switchboards and accessories, meters and instruments, motors, etc. The products are classified both by subjects and by catalog numbers in the indexes.

A convenient chart for the use of engineers who have occasion to calculate quantities connected with the expansion of steam is being distributed by the De Laval Steam Turbine Co., Trenton, N. J. The well-known Mollier diagram is printed upon a stiff sheet of bristol board, attached to which is a scale that can be broken off and used directly for measuring heat available, etc.

General Electric Co., Schenectady, N. Y., has issued a four-page folder describing and illustrating its single-stage centrifugal **air compressors.**

Electrical Drives for Power Plant Auxiliaries is the title of circular 7381, recently issued by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. The circular is well illustrated.

Sangamo Meters. Sangamo Electric Co., Springfield, Ill. Bulletin No. 70. Pp. 23; 8x10½ in.; illustrated. Describes the Sangamo type H single and polyphase watt-hour meters.



A Combination Conveyor-Loader (Patents Pending) *for Long Face Mining*

Showing flights on return standing on end (guard removed) in order to make machine narrow.

THE Jeffrey 44B Machine is a self-loading sectional conveyor and is used on faces preferably 100 ft. or more in length.

After coal has been undercut and shot, the conveyor is pushed into the loose material, the flights picking it up and carrying it away, along the face to a sectional conveyor which delivers it to either mine cars or to still another conveyor.

Built extremely low—the flights travel practically on the mine floor. Larger pieces can be readily rolled onto the conveyor than can be lifted into other types.

Made up in sections 10½ feet long—coupled together with a universal joint—can be quickly lengthened or shortened.

Send for complete information on the Conveyor-Loader and other Jeffrey Equipment for Aiding Concentrated Mining.

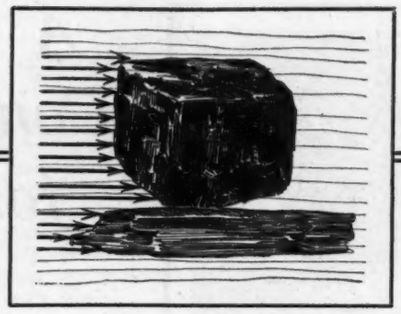
The Jeffrey Mfg. Co., 912-99 North Fourth St., Columbus, Ohio

New York.....30 Church St.
Philadelphia..1624 Real Estate Trust Bldg.
Pittsburgh.....600 Second Ave.
Scranton, Pa....518 Union Nat'l Bk. Bldg.
Charleston, W. Va.....914 Kanawha St.
Chicago.....858 McCormick Bldg.
Denver.....1639 18th St.
Salt Lake City.....508 Newhouse Bldg.
Birmingham.....19-27 South 20th St.
Montreal, Canada.....Power Bldg.

Sales and Service Stations

Pittsburgh.....600 Second Ave. Terre Haute, Ind.....319 Cherry St.

JEFFREY
COAL MINE EQUIPMENT



What does Rhéolaveur *mean?*

Rhéolaveur (French) translated means Current Washer.

The Rhéolaveur Process depends upon current washing for its primary classification. It utilizes the principle of specific gravities of the particles of coal, bone and slate, combined with the resistance their size and shape offers to a horizontal current of water.

By subjecting a mass of raw unwashed coal to a stream of water down an incline, the heavy slate quickly goes to the bottom of the chute and is slowed down by the friction against the bottom, while the lighter and more round coal tumbles over this lower strata and travels in a strata of its own making on top.

The Rhéolaveur Process utilizes this principle in a manner to get the greatest possible benefit from this phenomena.

This is the meaning of the name Rhéolaveur.

Write for further details and be sure to read the Rhéolaveur advertisements in the coming issues of Coal Age

American Rhéolaveur Corporation

New York Office:
120 Broadway

Wilkes-Barre Office and Laboratory:
911 Coal Exchange Bldg.

The Rhéolaveur
CURRENT WASHER

How and why it's built like the Vulcan Steam Locomotive

Here is the answer to the demand of the industry for a Trolley Locomotive with the same shock-resisting and long-service features as the Vulcan Steam Locomotive.

3-Point Suspension

The 3-Point Suspension of the entire chassis is an exclusive feature of the Vulcan Trolley Locomotive. One pair of springs supports the frame through one set of hangers. One end of another pair of springs is held by other hangers. The opposite ends of the springs engage an equalizing bar extending across the machine and supported in the center. By means of this arrangement shocks are absorbed, the weight is evenly distributed and the locomotive runs smoothly over any ordinary inequalities of track.

Other Features

Cast Steel Bar Frame

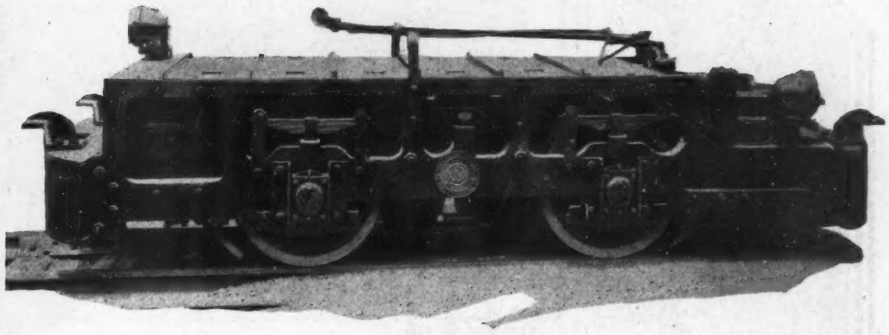
Each side frame is cast in one piece and of steel bar design, thus combining maximum rigidity as well as accessibility. The open spaces permit ample ventilation and simplify inspection.

Brake Rigging

The powerful, easily operated brakes, like the other two features, have been adopted in a large degree from Vulcan Steam Locomotive practice.

Vulcan Products

Hoists,
Electric and Steam
Locomotives,
Steam, Gasoline, Electric
Rotary Kilns, Dryers, Coolers and Roasters
Fairchild Double-Discharge Ball Mill
Mine Ventilating Fans
Cages and Skips
Sheave Wheels
Corliss Engines
Coal Crushers
Gray Iron Castings
Open Hearth Steel Castings
Gears, Moulded and Cut Teeth
Special Machinery



Sharp curves—
What if there are?

No danger of derailments around sharp curves when a Vulcan Trolley Locomotive is doing your hauling. Due to the 3-point suspension of the chassis and other shock and strain absorbing features, this Vulcan Electric Locomotive adjusts itself to sudden turns as well as bumps and abrupt grades. The service life is prolonged just as the life of the Vulcan Steam Locomotive which has records of 30 and 40 years on a job.

Look over the features listed in the panel on this page and send for the story complete.

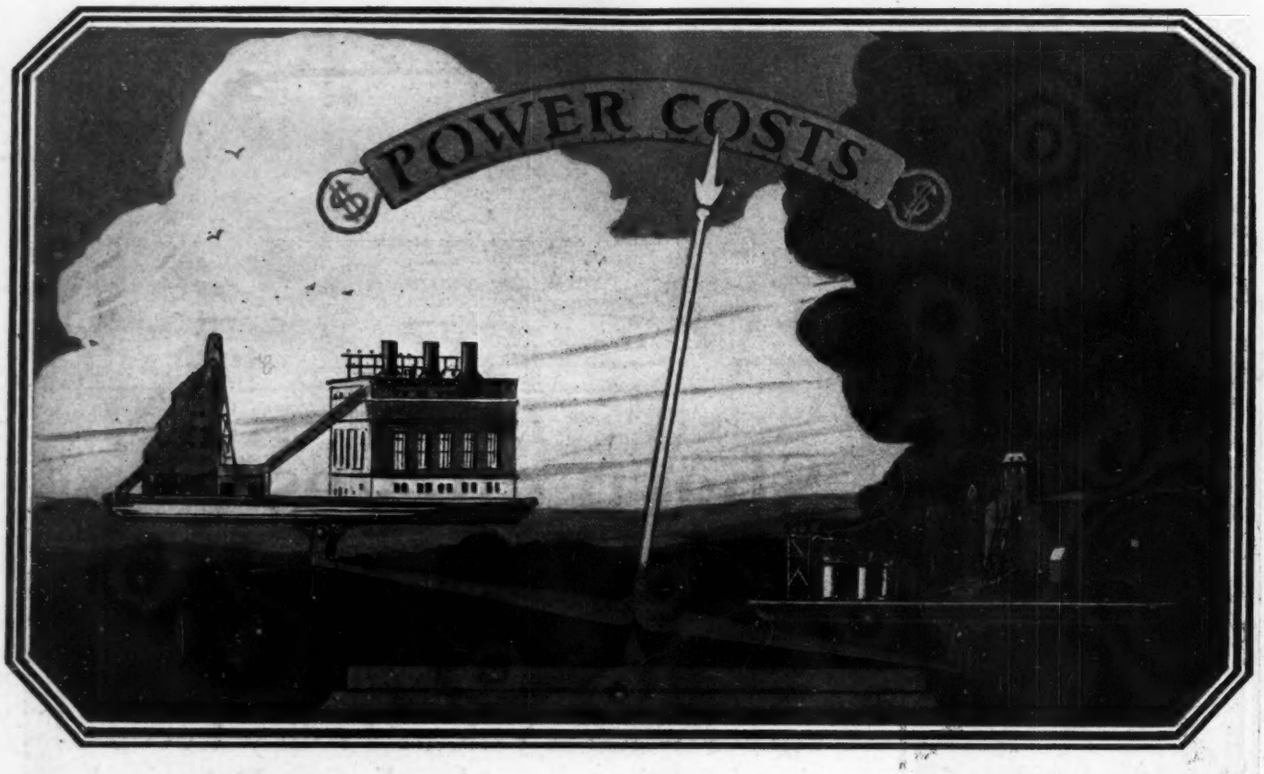
VULCAN IRON WORKS
WILKES-BARRE, PA.

New York:
50 Church St.

Chicago:
McCormick Bldg.

Established 1849

VULCAN of WILKES-BARRE
LOCOMOTIVES



"Should We Buy or Generate our Power?"

YOUR answer to this question should be based on facts! Either way your power bills are large enough to mount as power needs grow through increased mechanization and output.

Usually, if a proper water supply is available and load factors properly balanced, a coal mine of today's required capacity for economical production can burn its unmarketable coal in a well-designed power plant and generate its own power needs at less cost than central station service. Too often, however, antiquated equipment or needless operating expenses are responsible for abandoning mine power plants that might be regrouped or re-equipped with handsome returns on the investment. Too often the right choice is guessed at with either decision a mistake. And in too many instances inaccurate costs or *indifference* are wasting thousands of dollars yearly in excessive power bills.

Do you know your real power costs at present? Can they be reduced by a few simple changes in load cycles or distribution layout? Are you now scrapping mine waste that can be turned into kilowatts? Should you scrap or modernize your present plant? Can several wasteful plants be bunched to advantage in a high-efficiency "central" plant of your own? Or can you save real money by switching over to purchased power?

Allen & Garcia engineers are experienced in getting at the unprejudiced answers to these questions. Possibly the *correct* solution may have an unsuspected bearing on your costs-per-ton.

A Few of the Companies A & G Has Served on the Power Problem

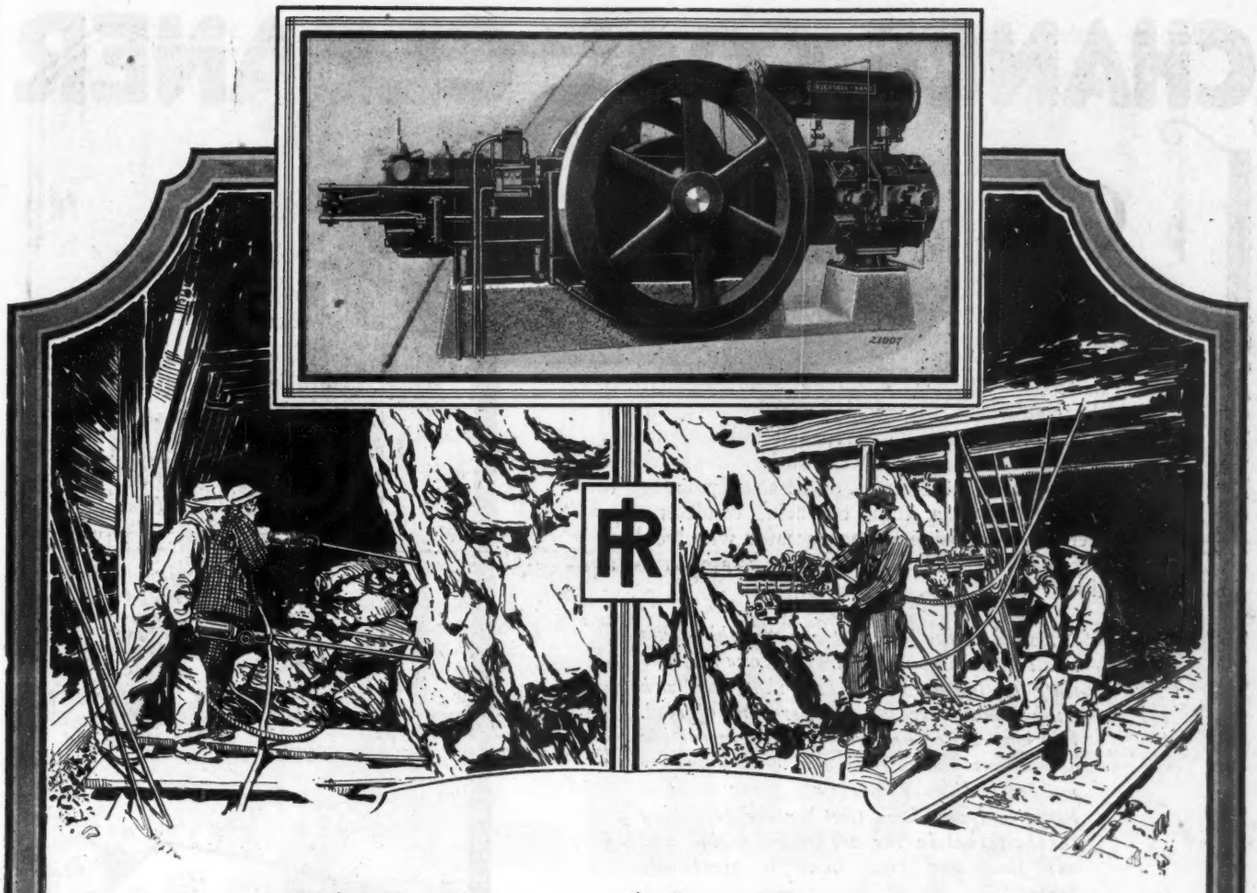
Donk Bros. Coal & Coke Co.
Chicago, Wilmington & Franklin Coal Co.
The Marcoll Coal Co.
J. K. Dering Coal Co.
Raleigh-Wyoming Coal Co.

Allen & Garcia Company
21 E. Van Buren St., Chicago

ALLEN & GARCIA

ENGINEERS AND BUILDERS OF MODERN COAL OPERATIONS

DESIGNING · CONSULTING CONSTRUCTING · TIPPLES · WASHERIES COMPLETE PLANTS · POWER PLANTS · ELECTRIFICATION · REPORTS · APPRAISALS



Cheaper Air Power

with an

I-R Oil Engine Air Compressor

The Ingersoll-Rand Type "POC-2" Oil Engine Air Compressor illustrated will operate a 10-hour shift at full load on 60 gallons of fuel oil and ½ gallon of lubricating oil.

With fuel oil costing 6 cents per gallon and lubricating oil 60 cents per gallon, the operating cost for a 10-hour shift is less than $4.00.

At full load, the compressor will furnish sufficient air for operating continuously three R-72 "Leyner-Ingersoll" Drifters or eight BCR-430 "Jackhamer" Drills.

These oil engine air compressors are rugged, simple, and reliable. They are the cheapest source of air power. Skilled operators are not required.

INGERSOLL-RAND COMPANY-11 BROADWAY, NEW YORK CITY.

Offices in principal cities the world over.

FOR CANADA REFER-CANADIAN INGERSOLL-RAND CO. LIMITED, 260 ST. JAMES STREET, MONTREAL, QUEBEC.

75-SOE

Ingersoll-Rand

CHANCE COAL CLEANER

COAL cleaned by the Chance process always meets established standards —and more than this, it sets a standard of its own that is unequalled by the product of any other method of preparation.

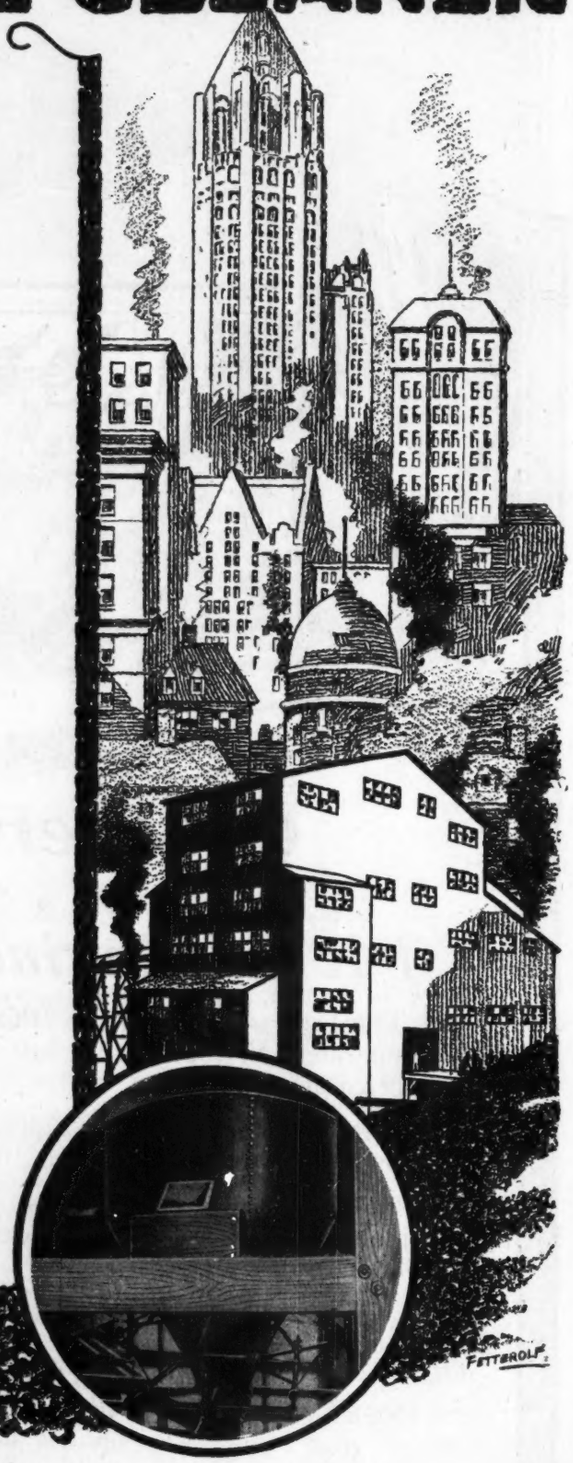
The Chance Cleaner meets these requirements regularly, continually, dependably day by day, without regulation after it is once adjusted and without any retreating of the output. One cleaner has marketed very close to a million tons of all sizes, from egg to birdseye without a single car being condemned or rejected. For instance, one operator who has been using a Chance Cleaner for three years writes as follows:

"In spite of the fact that our coal shipments in all sizes run on an average of one per cent slate or less, we still find that our rock bank seldom exceeds one per cent of coal. We have tested under very rigid inspection at various times, both the coal going to market, and rock and slate going to spoil bank, and we claim that we are preparing the best coal in the anthracite region and our slate and rock bank is practically perfect."

Other operators, who are using Chance Coal Cleaners, say:

"We obtain a much higher price for our coal." "The preparation of the coal is perfect from egg down to and including barley."

The necessity for meeting higher standards in the production of Anthracite is daily becoming clearer and more urgent, and the operator who equips his operation to produce the cleanest and best coal is the one who will retain his markets under competitive conditions and realize maximum returns. This is one of many ways in which the Chance Cleaner increases profits. Others are dealt with at length in a series of advertisement reprints that will be sent you upon request.



H. M. Chance & Co.
Engineers
Drexel Building
Philadelphia, Penna.

CHANCE COAL CLEANER

H. O. Staples
Sole Anthracite Licensor
Mears Building
Scranton, Penna.

M. A. WALKER, GENERAL MANAGER
MEARS BUILDING, SCRANTON PENNA.

Hulburt Products:

Mine Car Grease
Mining Machine and Locomotive Lubricant
Wool Yarn Elastic Grease
Cup Greases
Cable Dressing
Mechanical Loader Grease

HULBURT OIL & GREASE CO.
General Offices & Works Philadelphia, Pa.
Distributing Points Throughout Coal Fields

HULBURT

SPECIALISTS IN COAL MINE LUBRICATION

And King Coal rides behind them—

EVER since we began building locomotives (60 years ago) we have specialized in particular fields. Coal mining is one of them. The man who operates only one Porter or the man who runs a whole fleet of them is equally insured against breakdown or defects, both by the durability built into every Porter Locomotive and by the Porter *duplicate parts* system, which we originated.

We not only build—we also carry in stock a variety of all kinds of Porter Locomotives for all industries and every requirement of the engineering and contracting field.

Have you The Porter Catalog?

H. K. Porter Company

Established 1865. **PITTSBURGH, PA.**

***Export Rep.*—Wonham Bates & Goode Trading Corp.**
44 Whitehall St., New York City

PORTER LOCOMOTIVES

PORTER "better built" locomotives

The car that fits the needs of Northumberland Mining Co.

Length overall: 12′
Width overall: 4′ 8½″
Track gauge: 3′ 8″
Height inside: 2′ 6⅞″
Wheel base: 3′ 6″

Of big capacity for both hard and soft coal mines!

You would expect such a big capacity car as this (113 cubic feet water level) when built for the anthracite field, to be 9 to 12 inches higher. But the Northumberland Mining Company wanted it to meet the requirements of the bituminous fields too. So "Car Foundry" Engineers designed it accordingly—only 4 ft. $\frac{5}{8}$ inches overall, from the top of the rail.

It is a composite steel and wood proposition. A 2½-inch wood floor, covered with ¼-inch steel plate, acts as a cushion for buffing and provides, at the same time, a wearing surface to stand the gaff of mechanical loading and end gate dumping.

It has an adjustment for bearing outside the wheels, allowing the wheels to be replaced without difficulty—a low-maintenance-cost feature which bids fair to gain wide popularity in the mining industry.

"Whatever your car needs, you can depend upon Car Foundry" Engineers to design and build the type most suited.

Get a "Car Foundry" quotation before you buy.

American Car and Foundry Co.
New York St. Louis Chicago Pittsburgh

3 SERVICE PLANTS

These "Car Foundry" Service Plants, each in the heart of a great mining region, enable us to render a national service with "localized" advantages—no matter where your mine is located.

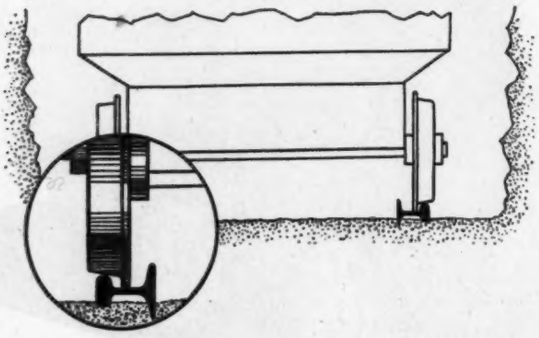
Berwick, Pa. Huntington, W. Va. Terre Haute, Ind.

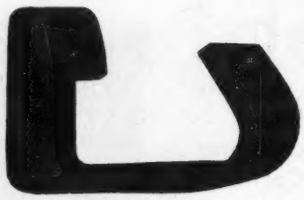
"CAR FOUNDRY"

ELECTRIC RIVET HEATERS
BARS, IRON AND STEEL
CAR IRONS

BOLTS, NUTS, RIVETS
IRON BODY GATE VALVES
CAR TRUCKS

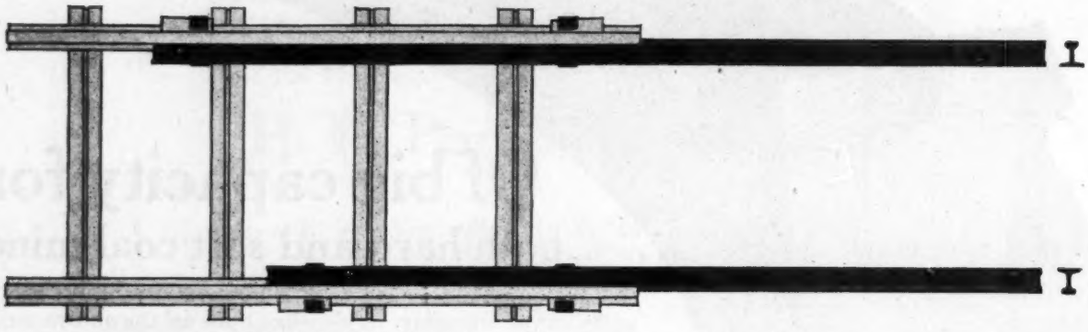
CHILLED IRON WHEELS
PINS AND LINKS
FLANGED PIPE





Grimm Rail Clamp

Grimm Rail Clamps provide a quick and handy means of extending track. The clamps firmly hold the rails together, and under load the flanges of the "Balled" rails become embedded in the mine floor, preventing spreading and offering great rigidity for Arc Wall Mining Machines.

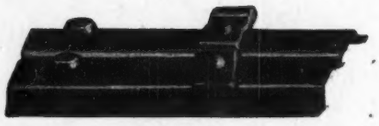


How to save money!

THE problem of how to save money in extending or "balling" track at the mine face has been efficiently and economically solved for you in the Grimm Rail Clamp.

This is how it is done. The use of Grimm Rail Clamps lessens the amount of capital invested; eliminates the use of six ties at each mine face; gives more clearance for mine cars which allows bigger loads; and if wooden ties are used the saving in the cost of spikes, at each mine face, will almost buy a set of clamps. In addition to the foregoing, Grimm Rail Clamps save time and labor, thus increasing production.

There is nothing about the clamp to wear out—you can use it for years. Let us demonstrate the many advantages and money-saving features of the Grimm Rail Clamp.



The Bethlehem "Standard" Tie

For general use in Mining and Industrial track. Tie is made to fit any rail section from 16 lb. to 60 lb. per yard, and to any track gage.

The "Universal" Tie

This tie is made purposely to meet conditions where there are several different rail sections in use, and where severe corrosive conditions affect the rail base. The same tie will fit all rail sections from 16 lb. to 30 lb. per yard.

Bethlehem Track Specialties for Mining and Industrial Use

include Grimm Rail Clamps, Rails, Mine Ties, Splice Bars, Bolts and Nuts, Switches, Coupling Pins and Links and Mine Car Sprags.

BETHLEHEM STEEL COMPANY, *General Offices:* BETHLEHEM, PA.

District Offices:

New York Boston Philadelphia Baltimore Washington Atlanta Pittsburgh Buffalo
Cleveland Detroit Cincinnati Chicago St. Louis San Francisco Los Angeles Seattle

Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of our Commercial Products

BETHLEHEM

Little Giant Electric Coal Drills

For Use in Gaseous Mines

Little Giant Permissible Electric Coal Drill.

All running parts of the motor are fully enclosed in a sealed motor housing. Furnished in Reversible and Non-reversible types for operation on direct current only, 115 and 250 volts.

WHATEVER may be the atmospheric conditions in your coal mine, there is a Little Giant Portable Electric Drill that will meet the need. Operators in every Coal Producing State have conclusively proven through the installation of these machines that they reduce costs, speed up production, crowd development and increase the percentage of lump coal.

The Little Giant Permissible Electric Drill shown at the left is approved by the U. S. Bureau of Mines for use in gaseous mines or dust laden atmosphere. Now every shot hole can be bored electrically, even though your mine is liable to outbursts of gas at the faces.

When Little Giant Drills are used, the whole mining operation is smoother, safer and speedier. Write for Bulletins containing full information.

Chicago Pneumatic Tool Company

6 East 44th Street, NEW YORK, N. Y.

*Sales and *Service Branches all over the World*

*Birmingham	Dallas	*Los Angeles	*Philadelphia	*San Francisco	*Bombay	Dairen	Helsingfors	*London	Moncton	Oslo	Santiago	Timmins
*Boston	Denver	*Minneapolis	*Pittsburgh	*Seattle	*Brussels	*Durban	Honolulu	Manila	*Montevideo	*Paris	*Sao Paulo	Tokyo
*Chicago	*Detroit	*New Orleans	Richmond	*St. Louis	*Buenos Aires	*Havana	*Johannesburg	*Mexico City	*Montreal	Rio de Janeiro	Seoul	*Toronto
*Cincinnati	El Paso	*New York	Salt Lake City	Tulsa	Calcutta		Kobe	*Milan	Osaka	*Rotterdam	Stockholm	*Vancouver
*Cleveland	Houston			*Berlin	Copenhagen						Tampico	*Winnipeg

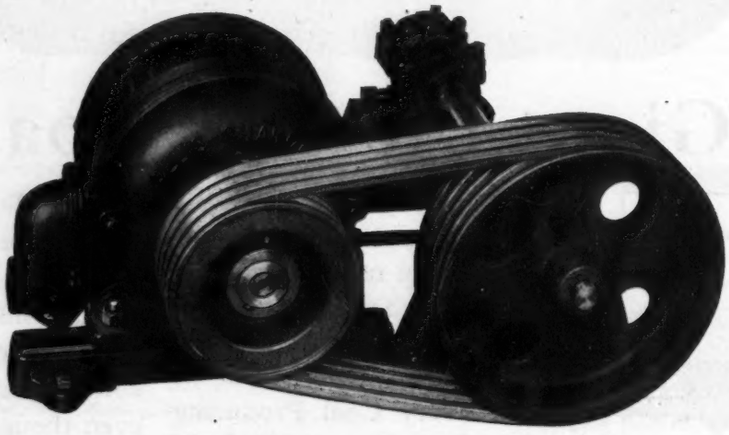
Canadian Pneumatic Tool Company, Ltd., Montreal, manufacturers of Chicago Pneumatic products in Canada
Consolidated Pneumatic Tool Company, Ltd., London, manufacturers of Chicago Pneumatic products in England

EL-105

BOYER PNEUMATIC HAMMERS · · LITTLE GIANT PNEUMATIC AND ELECTRIC TOOLS
CHICAGO PNEUMATIC AIR COMPRESSORS · · VACUUM PUMPS · · PNEUMATIC HOISTS,
GIANT OIL AND GAS ENGINES ROCK DRILLS · · COAL DRILLS

LITTLE *Electric* **GIANT** *Tools*

ANNOUNCING
THE
ALLIS
TEXROPE DRIVE
PATENTS PENDING



10 H. P. Motor and Allis Texrope Drive

A FLEXIBLE AND POSITIVE MULTIPLE BELT DRIVE FOR CLOSE CENTERS

PRINCIPAL ADVANTAGES:

1. Remarkable Smoothness.
2. No Lost Motion.
3. No Slip, Fixed Speed Ratio.
4. Does Not Transmit Vibration or Jerks.
5. Flexible and Shock Absorbing.
6. Light Bearing Pressures.
7. Not Affected by Moisture or Dirt.
8. Short Centers.
9. Silent.
10. Clean.
11. Trouble Proof.
12. Simple.
13. Economical.
14. Safe.

Applicable to every industry. Already in service in ⅛ to 250 H.P. sizes. Ratios up to 1 to 7, replacing chains, gears and belts.

Write for Bulletin 1228

ALLIS-CHALMERS
MILWAUKEE, WIS. U. S. A.

Lift yourself by your boot straps

THROUGHOUT the past year these advertisements have told you about Linde Process Service for Linde users. They have shown how it can help you, whether you have only a comparatively simple job, or whether you want to make the oxy-acetylene process part of your production work with all the managerial and engineering problems that this involves.

Linde Process Service goes even further. Under the title of Procedure Control, instructions are being assembled for every application of the oxy-acetylene process. So, when you ask for help, we shall be able to send you a set of instructions for your particular job. They will tell you how to select your materials, how to instruct your welders, how to set up and carry out the work, and how to test the finished job.

So you can, in reality, lift yourself by your boot straps. Linde Service men will always be available when needed, but, with the aid of Procedure Control alone, you will be able to apply the oxy-acetylene process to your manufacturing problems.

Next year our advertising will describe some of the outstanding achievements of the oxy-acetylene process in industry—achievements made possible by the use of Linde Process Service.

Check the books you want, tear out this list and mail it to the nearest District Office

- ☐ Cast Iron Welding by the Oxy-Acetylene Process
- ☐ The Dependability of Cast Iron Welding
- ☐ Gas Welded Pipe Joints
- ☐ How Welded Joints Solved Pipe Line Troubles
- ☐ Step by Step in Oxwelding a Pipe Joint
- ☐ Welding Small Tanks by the Oxy-Acetylene Process
- ☐ The Oxygen Lance
- ☐ Welding and Cutting for the Manufacture and Maintenance of Chemical Equipment
- ☐ Step by Step in Gas Welding a Cylinder Block
- ☐ Severing Metals by Oxidation
- ☐ The Handling, Storage and Return of Cylinders for Compressed Gases
- ☐ The Importance of Managerial Understanding of Welding

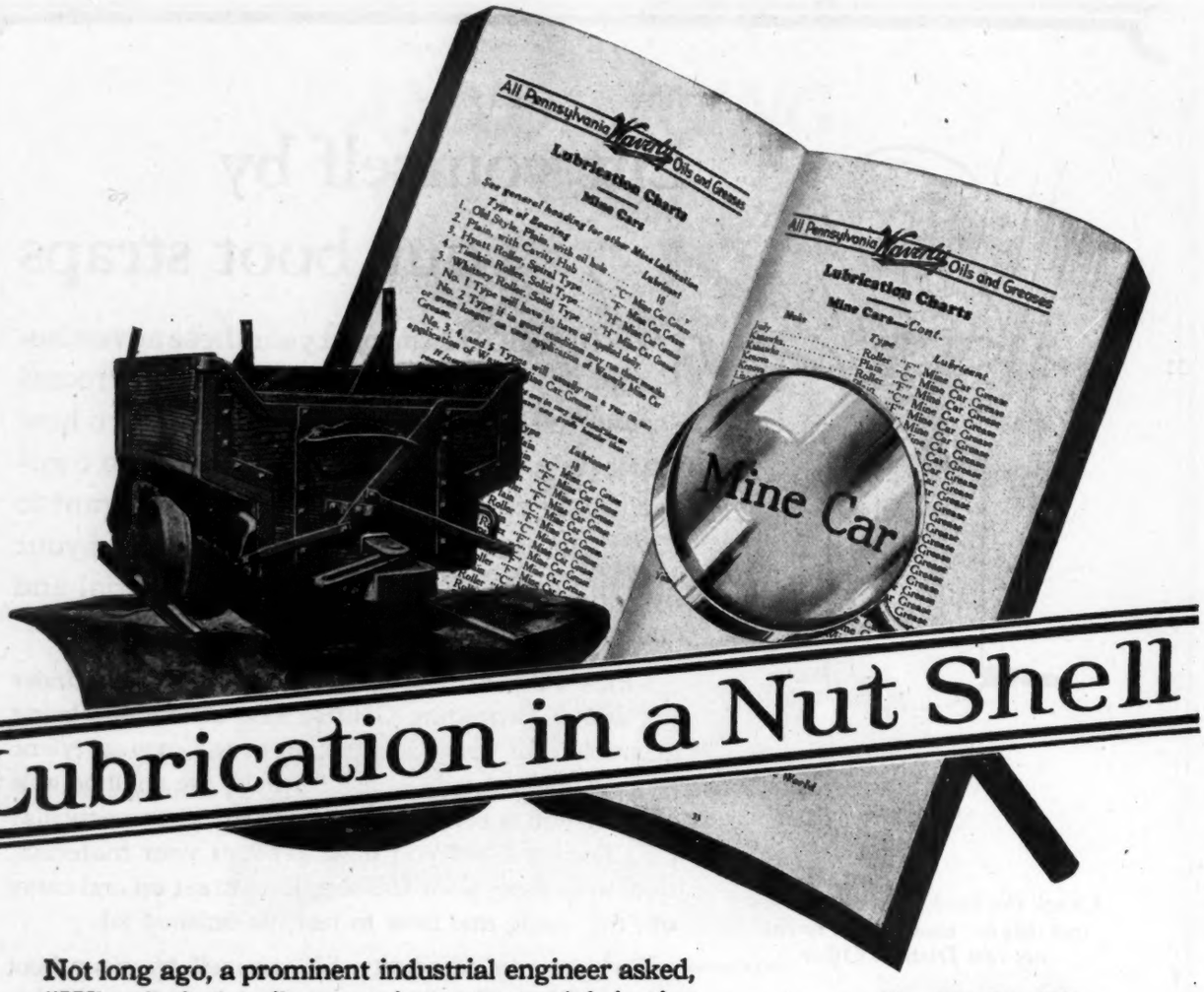
THE LINDE AIR PRODUCTS CO.

General Offices:
Carbide and Carbon Building, 30 E. 42d Street
New York, N.Y.

37 Plants *22 District Sales Offices* *91 Warehouses*

LINDE OXYGEN

YOU CAN DEPEND ON THE LINDE COMPANY



Lubrication in a Nut Shell

Not long ago, a prominent industrial engineer asked, "Why don't the oil companies put out a lubrication chart for industrial machinery similar to the automobile charts now so popular all over the country?" Acting on his suggestion, and after a long, tedious research, we have produced the first of its kind for general distribution.

Here it is!

Every mine superintendent, every mine engineer, and everyone who has to do with mine lubrication should have one of these books. In addition to the lubrication charts, they contain a valuable treatise on Industrial Lubrication. This is not an advertisement: it is primarily an aid to industry as a whole, and everyone should avail himself of our offer to mail him a copy—gratis.

Use the coupon, if you like.

Waverly Oil Works Company
5401 FIFTY-FOURTH ST. PITTSBURGH, PA.
Established 44 years

Gas Engine Oils
Air Compressor Oils
Turbine Oils
Engine Oils
Cylinder Oils
Steel Mill Greases
Paper Mill Greases
Special Greases
for every conceivable purpose

(Cut along this line).

WAVERLY OIL WORKS CO.
5401-54TH ST., PITTSBURGH, PA.

Please send me copy of the Waverly Industrial Lubricating Chart.

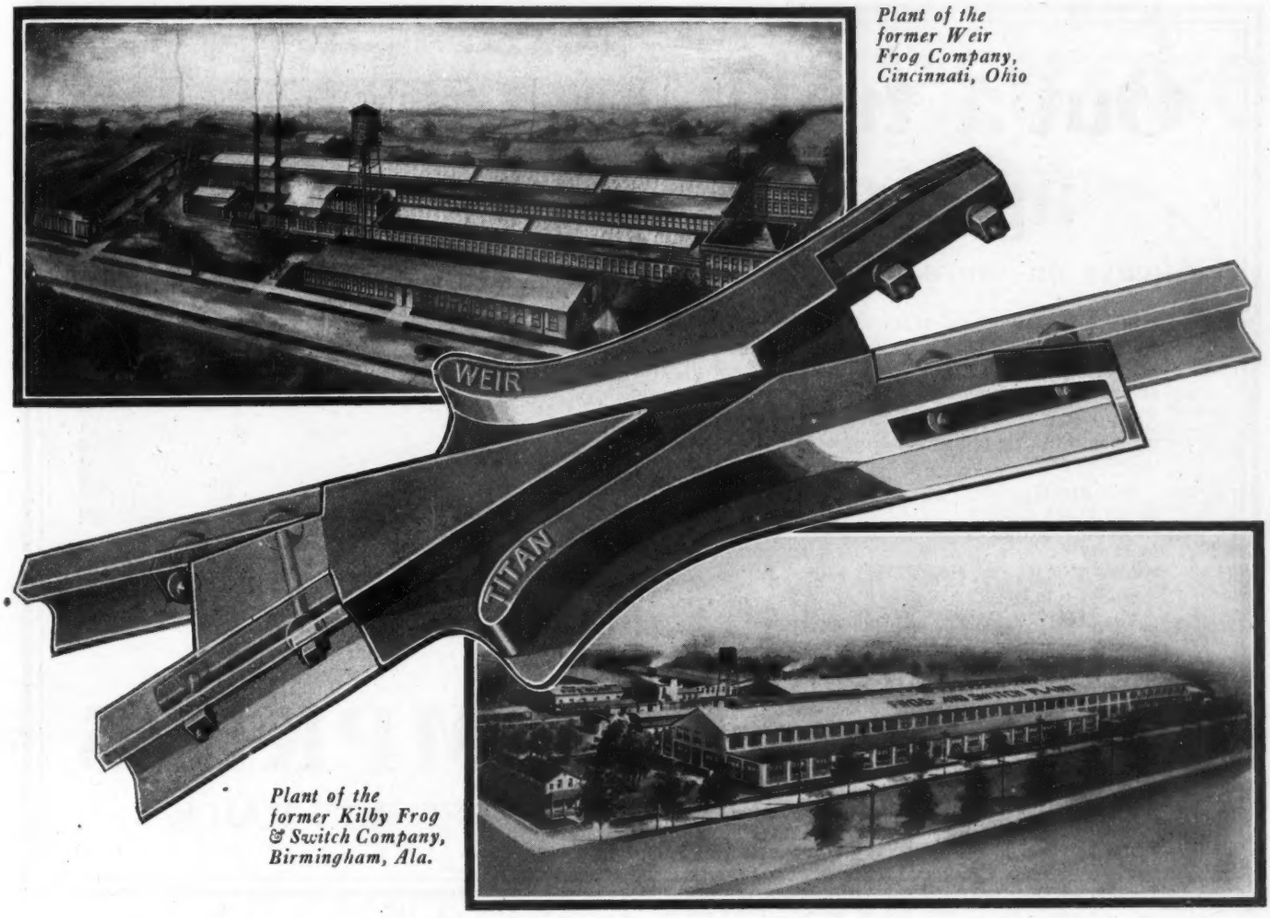
Name.....

Address.....

City..... State.....

BY INVITATION MEMBER OF RICE LEADERS OF THE WORLD ASSN MEMBER OF PENNSYLVANIA GRADE CRUDE OIL ASSN.

Guaranteed 100% PURE PENNSYLVANIA OIL



Plant of the former Weir Frog Company, Cincinnati, Ohio

Plant of the former Kilby Frog & Switch Company, Birmingham, Ala.

A consolidation that doubles service facilities

This consolidation of the former Weir Frog Company and the Kilby Frog & Switch Co. of Birmingham, Ala., as the Weir Kilby Corporation, Cincinnati, Ohio, is in line with the Weir ideal of constant improvement in service to the coal mines of America.

Now, as never before, real efficiency is the prime necessity at all coal-mining property to meet the new-day conditions, and only those haulage tracks that are kept in good condition can handle the heavy trains at high speed that modern mining demands.

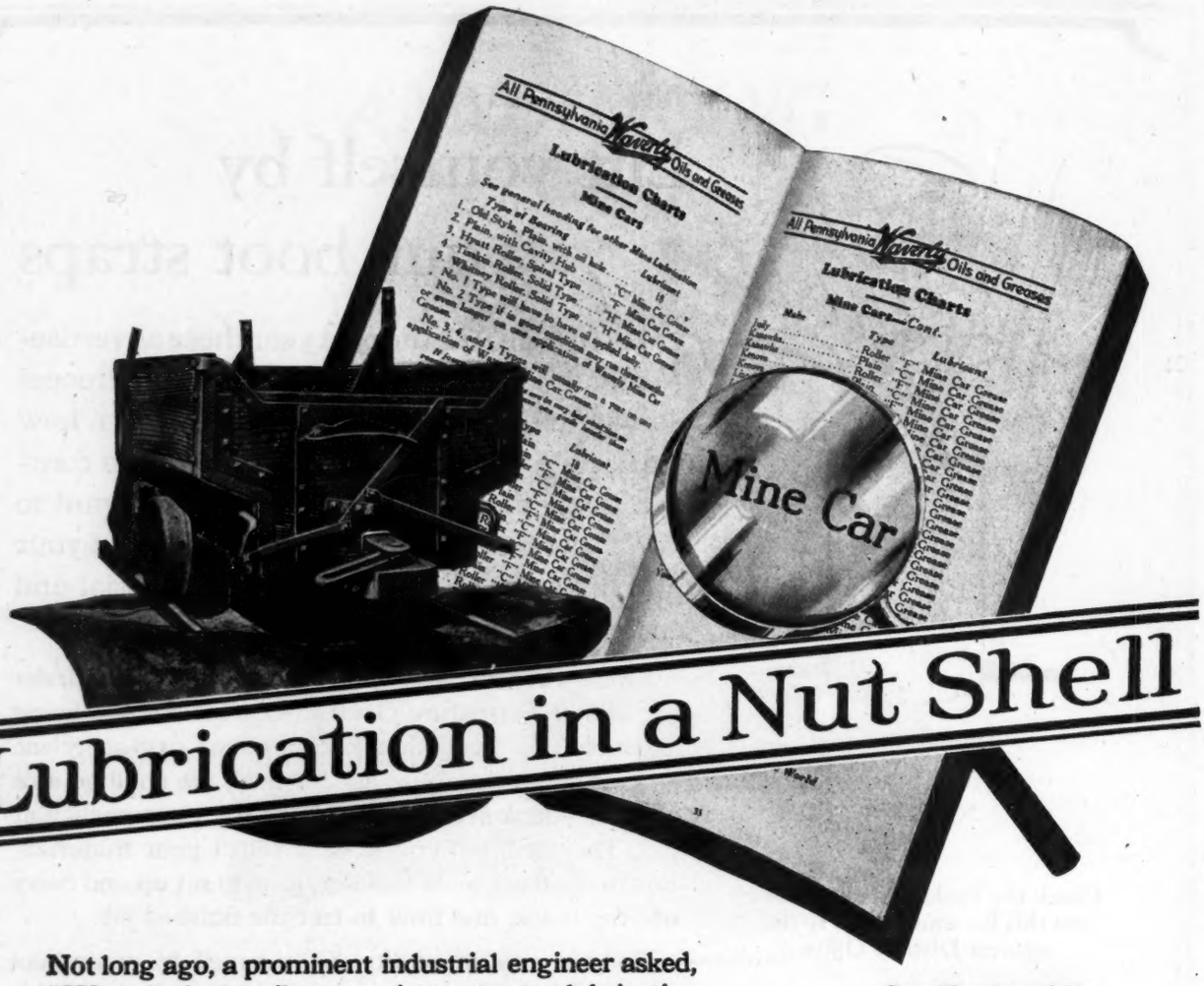
Well-built, rightly designed frogs, switches, switchstands, room turnouts, crossings, etc., for which the name WEIR and KILBY have both become recognized, must help mine operators maintain production schedules and keep production at rock-bottom costs.

"Wire Weir" now has a double significance. It means still better service! *Try it.*

WEIR KILBY CORPORATION
Cincinnati, Ohio

WEIR

FROGS · SWITCHES · STANDS



Lubrication in a Nut Shell

Not long ago, a prominent industrial engineer asked, "Why don't the oil companies put out a lubrication chart for industrial machinery similar to the automobile charts now so popular all over the country?" Acting on his suggestion, and after a long, tedious research, we have produced the first of its kind for general distribution.

Here it is!

Every mine superintendent, every mine engineer, and everyone who has to do with mine lubrication should have one of these books. In addition to the lubrication charts, they contain a valuable treatise on Industrial Lubrication. This is not an advertisement; it is primarily an aid to industry as a whole, and everyone should avail himself of our offer to mail him a copy—gratis.

Use the coupon, if you like.

Waverly Oil Works Company

5401 FIFTY-FOURTH ST. PITTSBURGH, PA.

Established 44 years

Gas Engine Oils
Air Compressor Oils
Turbine Oils
Engine Oils
Cylinder Oils
Steel Mill Greases
Paper Mill Greases
Special Greases

for every conceivable purpose

(Cut along this line)

WAVERLY OIL WORKS CO.
5401-54TH ST., PITTSBURGH, PA.

Please send me copy of the Waverly Industrial Lubricating Chart.

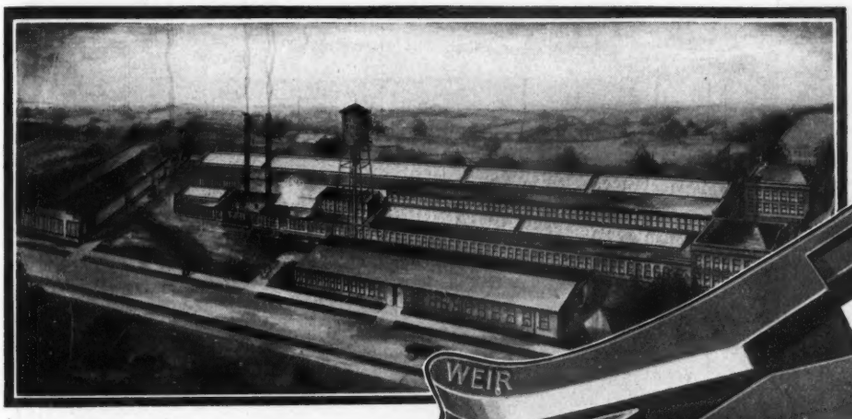
Name.....

Address.....

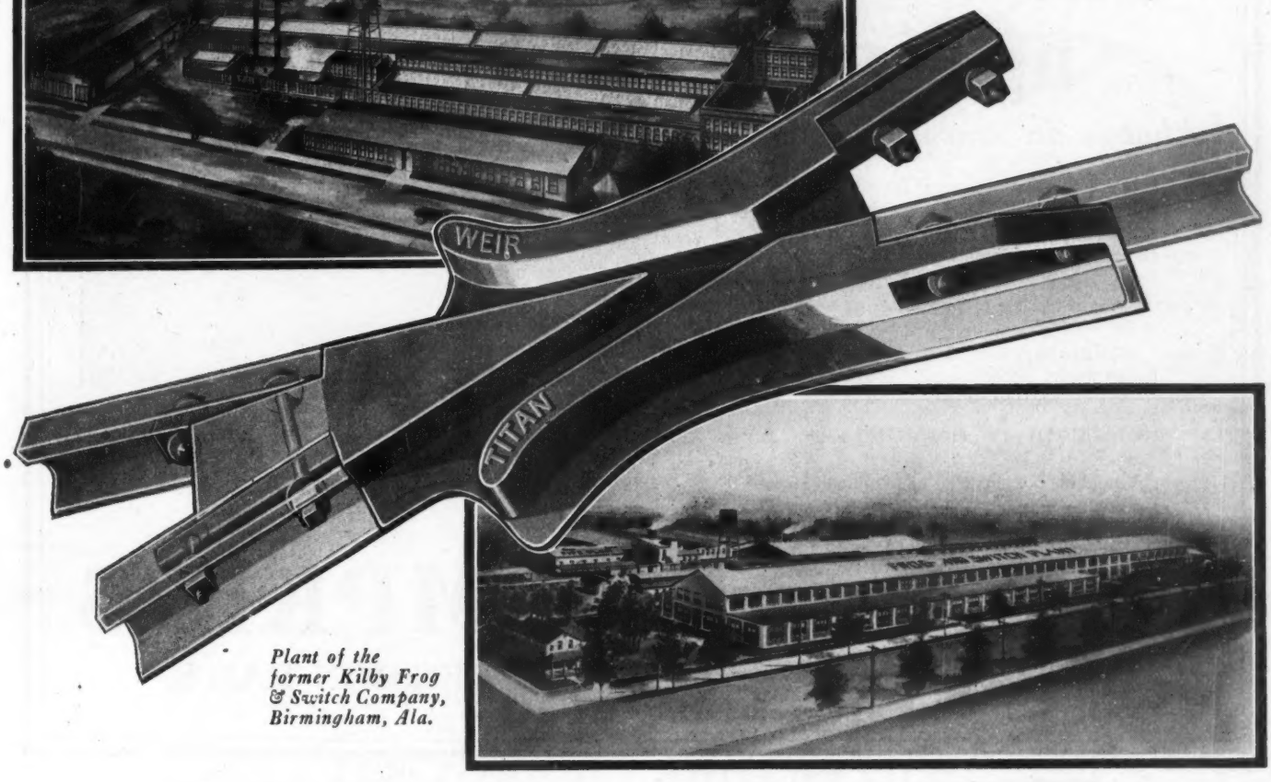
City..... State.....

BY INVITATION MEMBER OF RICE LEADERS OF THE WORLD ASSN MEMBER OF PENNSYLVANIA GRADE CRUDE OIL ASSN.

Guaranteed 100% PURE PENNSYLVANIA OIL



Plant of the former Weir Frog Company, Cincinnati, Ohio



Plant of the former Kilby Frog & Switch Company, Birmingham, Ala.

A consolidation that doubles service facilities

This consolidation of the former Weir Frog Company and the Kilby Frog & Switch Co. of Birmingham, Ala., as the Weir Kilby Corporation, Cincinnati, Ohio, is in line with the Weir ideal of constant improvement in service to the coal mines of America.

Now, as never before, real efficiency is the prime necessity at all coal-mining property to meet the new-day conditions, and only those haulage tracks that are kept in good condition can handle the heavy trains at high speed that modern mining demands.

Well-built, rightly designed frogs, switches, switchstands, room turnouts, crossings, etc., for which the name WEIR and KILBY have both become recognized, must help mine operators maintain production schedules and keep production at rock-bottom costs.

"Wire Weir" now has a double significance. It means still better service! *Try it.*

WEIR KILBY CORPORATION
Cincinnati, Ohio

WEIR

FROGS · SWITCHES · STANDS

Out'a track again!

Always an unwelcome message

When the loader's out of track—and the track crew's busy elsewhere you know what happens.

It means ***that production costs are going up and tonnage is going down.***

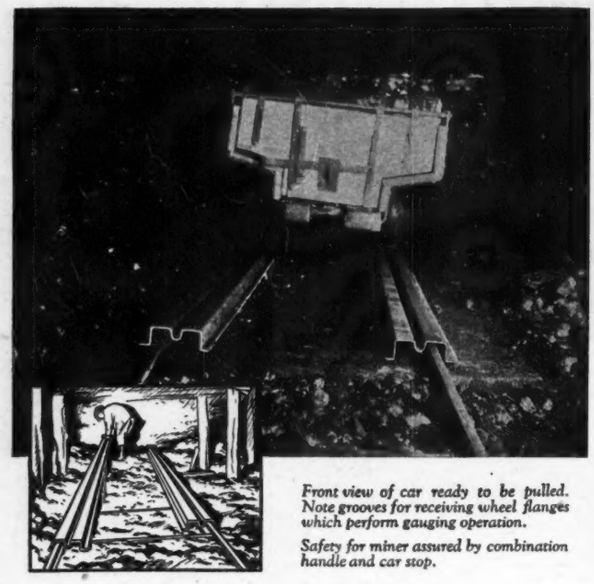
If the loaders in ten rooms out of a hundred run out of track it means a ten per cent decrease in tonnage and a still bigger increase in costs.

Why run the risk? It is no longer necessary. Every loader equipped with a set of Tompkins' Extension Rails can put them in position himself in thirty seconds, and eliminate all temporary track laying costs. No ties, no spikes, plates, bolts, nuts, or tools.

Tompkins' Extension Rails come in 16 and 20 ft. lengths "Standard" and "Heavy Duty" weights. They slip right over the ends of permanent track. Strong, durable, and practically last forever.

Get a few sets and try them out. We know you'll like them. Your jobber will see that you are supplied promptly or write us.

THE MIDLAND STEEL PRODUCTS CO.
CLEVELAND, OHIO



Front view of car ready to be pulled. Note grooves for receiving wheel flanges which perform gauging operation.

Safety for miner assured by combination handle and car stop.

TOMPKINS
EXTENSION RAILS

How Shays Save Money In Strip Mine Hauling

May we send you a copy of our catalog?

SHAYS are saving their cost over and over again in many strip mines, by serving continuously and dependably over long periods of years, operating on inexpensive track, over steep grades and sharp curves.

"We are using six Shays," writes the Superintendent of one company. "They have been in service since 1908 and 1911 and are doing their work as well as new machines.

"They will operate on track that a rod engine could not move on."

This company is using various types of locomotives at their operations, but they say, "for traction and power, the Shay leads them all."

May we explain how powerful and dependable Shays can reduce your hauling expense?

LIMA LOCOMOTIVE WORKS
Incorporated
Lima, Ohio
17 East 42nd Street, New York

Behind every Brush-stroke

Put the Triple Protection of Du Pont Prescription Paint Service

Copyright 1924 by E. I. du Pont de Nemours and Company

It protects your mining property from three angles.

First—we *know* the *causes* of corrosion and decay of metal, wood and concrete in the coal industry and we will send experts to check up conditions in *your* particular property.

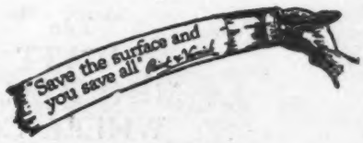
Second—we know the proper *composition* of paint to check rust, decay or corrosion under any given conditions.

Third—our experts will select the correct paint for any given protective problem—not merely paint, but the *right* paint for the circumstances and materials.

This Service covers all your mine or any part of it. Let a Du Pont expert call to make recommendations.

E. I. du Pont de Nemours & Co., Inc.
3500 Gray's Ferry Road, Philadelphia, Pa.

2100 Elston Ave., Chicago, Ill.
Everett Station (49), Boston, Mass.
21 E. Fortieth St., New York City.



PAINTS & VARNISHES
for every Household **DU PONT** **and Industrial Use**

TRADE MARK REGISTERED

FAIRMONT

COMPLETE TIPPLE INSTALLATIONS

PRODUCTS

STEEL TIPPLE STRUCTURES
DUMPS - ALL TYPES
FEEDERS - ALL TYPES
CAR HAULS
WEIGH BASKETS
CONVEYORS - ALL TYPES
SCREENS - GRAVITY
SCREENS - SHAKER
PICKING TABLES
LOADING BOOMS
STEEL MINE TIES
PORTABLE PUMPS
TURTLE BACK STRAINERS
RAILROAD CAR RETARDERS
MINE CAR BODIES (STEEL)
BOX CAR LOADERS
UNDERGROUND FACE CONVEYORS

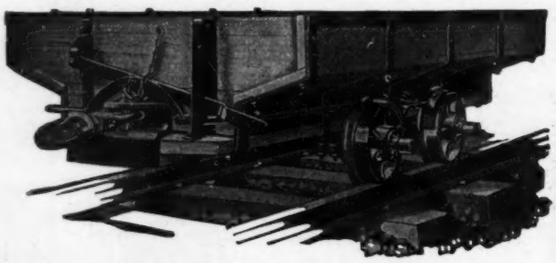
BULLETINS ON REQUEST

FAIRMONT MINING MACHINERY CO.
FAIRMONT - WEST VA.

Birmingham, Ala., Kaiser-Geismer Engineering Co.
Huntington, W. Va., Huntington Supply & Equipment Co.
Harlan, Ky., McCombs Supply Co.

— SALES OFFICES: —
Pittsburgh, Pa., Fairmont Mining Machinery Co., State Bldg.

Denver, Colo., O. H. Davidson Equipment Co., 1633 Tremont St.
Evansville, Ind., Evansville Structural Supply Co.
Terre Haute, Ind., Industrial Supply Co.



We shipped Watt Cars to northern Canada 14 years ago—had hard service and now they are bringing them back to the States for another mine operation.

IT PAYS TO BUY
WATT CARS
"The Best"

The
WATT
MINING CAR
WHEEL CO.
Barnesville,
Ohio

SELLING "WATT QUALITY PRODUCTS"
Pittsburgh, Pa.—W. C. Wilson, 1135 Greenfield Ave.
New York, N. Y.—C. R. Gier Co., 66 Beaver St.
San Francisco, Cal.—N. D. Phelps, Sheldon Bldg.
Huntington, W. Va.—J. E. Graham, 341 Sixth Ave.
Chicago, Ill.—W. W. Baker, 140 South Dearborn St.
Denver, Colo.—Lindrooth, Shubart & Co., Boston Bldg.
Birmingham, Ala.—Industrial Supply Co.

Scottdale
Coal Tipple Equipment

Screens, picking tables, shakers, loading booms, feeders and other Scottdale coal mining machinery, are all designed to handle coal efficiently nd with minimum breakage.

25 years' experience in the design and manufacture of coal tipple equipment, with intimate contact with the development of mining practice, qualifies the Scottdale engineering staff.

Besides manufacturing coal tipple machinery we also design and erect complete coal-handling plants.

Send for Bulletin 802

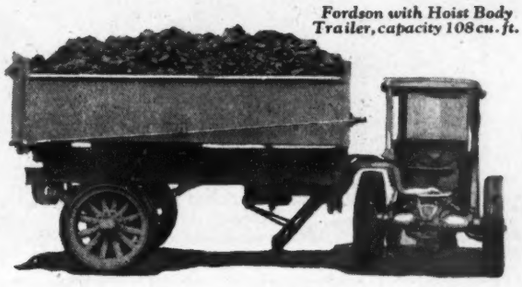
Marion Machine, Foundry & Supply Co.
Box 950, Scottdale, Penn.

MARION MINING MACHINERY

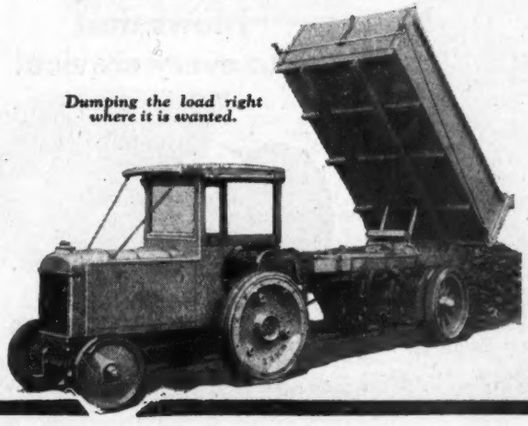
Fordson with 5-Ton Dump Body Trailer used for coal deliveries by Campbell Coal Co., Memphis

Fordsons are Low-Cost, Full-Time Coal Haulers

The Fordson loading coal for city delivery



Fordson with Hoist Body Trailer, capacity 108 cu. ft.



Dumping the load right where it is wanted.

Fordson Tractors are taking the place of heavy, expensive hauling equipments in many of the leading coal yards of the country. The investment is only a fraction of the cost of heavy duty trucks.

The Fordson with shovel equipment or conveyer bucket loaders can also eliminate the costly expense of hand loading. This is another of the many jobs in which the Fordson proves extremely useful around coal yards.

Your nearest Authorized Ford Dealer will gladly show you facts concerning Fordson performance in the coal business. Let him substantiate these claims with a complete Fordson demonstration in your yards.

Ford Motor Company
DETROIT, MICH.

Fordson
$495
F. O. B. DETROIT

Sure Grip

MANY "improved" trolley clamps have been put on the market since the Sure Grip was first produced but after seventeen continuous years, the Sure Grip still remains the standard. Engineers of this company have found no possible way to improve upon the Sure Grip design and apparently no other manufacturer has been able to produce as good a clamp.

Electric Railway Equipment Co.
2900-2918 Cormany Ave.
Cincinnati, Ohio

WILMOT

Coal Preparation Specialties

"KEYSTONE" Rivetless Conveyor Chain saves time, temper and money. Try it where requirements are super exacting. The element of chance is absent with the purchase of any WILMOT equipment. *Compound Geared Rolls—Hollow Ground Roll Teeth—Simplex and other Coal Jigs—Flexible Arm Shaking Screens—Castings and Machine Work. Write*

WILMOT ENGINEERING CO., Hazleton, Penn.
Works: White Haven, Penn.

IT CONVEYS COAL WITH A WAVE-MOTION

The Eickhoff Wave-Motion Conveyor carries coal from face to mine car in a series of powerful wave-like surges. The coal goes forward continuously, smoothly, rapidly. 16,000 installations in European mines testify to the practicability and wide adaptability of the Eickhoff.

Conveyor Sales Co., Inc.
299 Broadway, New York
Sole American Agents

Lowest first cost of any other conveyor and lowest operating and maintenance costs.

Write for complete story.

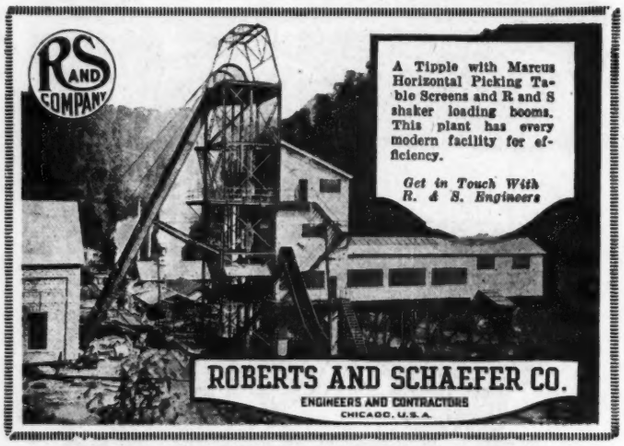
Eickhoff JIGGING CONVEYOR

HENDRICK SCREENS

for every purpose

ELEVATOR BUCKETS (plain and perforated) **STACKS AND TANKS**
MITCO INTERLOCKED STEEL GRATING
LIGHT AND HEAVY STEEL PLATE CONSTRUCTION

HENDRICK MFG. CO. **CARBONDALE, PENNA.**
New York Office, 15 Johns St. Pittsburgh Office, 954 Union Trust Bldg.
Hazleton, Penna., Office, 705 Markle Bank Bldg.



A Tipple with Marcus Horizontal Picking Table Screens and R and S shaker loading booms. This plant has every modern facility for efficiency.

Get in Touch With R. & S. Engineers

ROBERTS AND SCHAEFER CO.
ENGINEERS AND CONTRACTORS
CHICAGO, U.S.A.

Complete Tipples — Washeries
Conveyors, All Types
Loading Booms — Picking Tables
Chains — Shaker Screens — Wheels
Car Dumps — Car Hauls
Elevators — Buckets — Crushers

THE PITTSBURGH COAL WASHER COMPANY
Fulton Building, Pittsburgh, Pa.

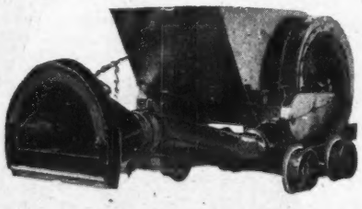
This Legrabon Rock Dusting Machine blows dust, from a double-shell discharge, distributing it uniformly to every part of roof, ribs and floor. The dust train, including the machine and two cars of dust, is easily propelled to any part of the mine.

Get the facts complete.

Diamond Machine Co.
Monongahela, Pa.

Selling Agent—Cooke-Wilson Electric Supply Company, Pittsburgh, Pa., Athens, Ohio, Charleston, W. Va.

Blows dust into every crevice!



The Legrabon Rock Duster

Fig. 227, Jenkins Pump Valves

Get a pump valve to fit the service

In its composition a pump valve must fit the service in which it is to be used, the fluid handled and the pressure the pump is working against. Jenkins Pump Valves afford the engineer a range of choice which assures him of the proper valve. A schedule of these pump valves and the service for which each is guaranteed is yours for the asking.

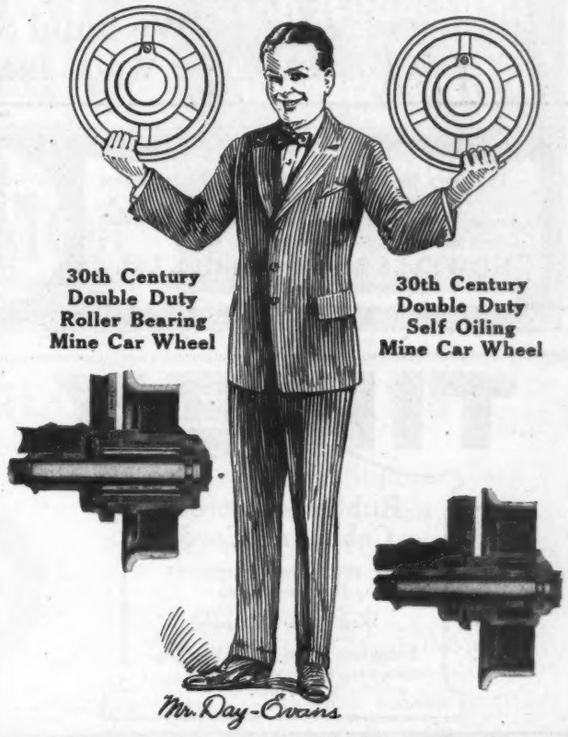
JENKINS BROS.

80 White Street.....New York, N.Y.
524 Atlantic Avenue.....Boston, Mass.
133 No. Seventh Street.....Philadelphia, Pa.
646 Washington Boulevard.....Chicago, Ill.

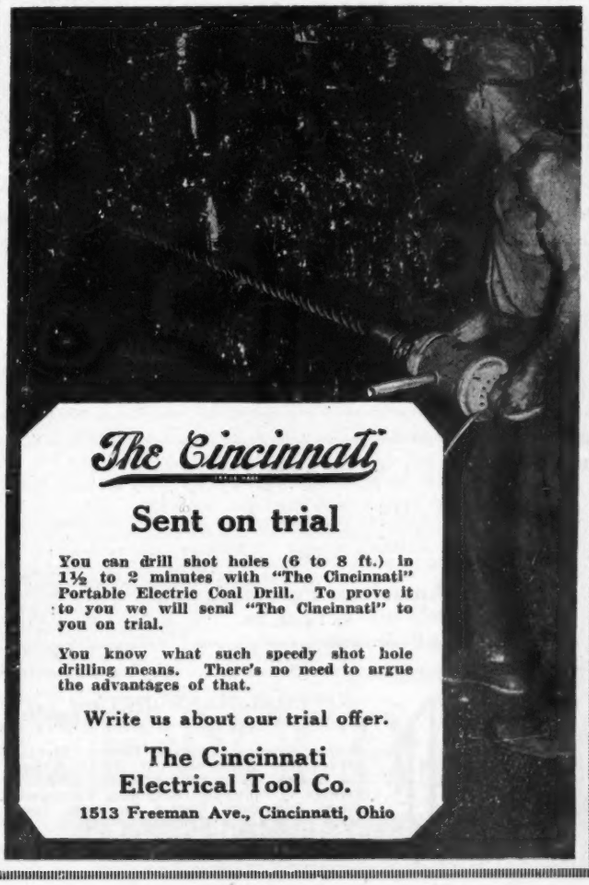
JENKINS BROS., LIMITED
Montreal, Canada London, England

Always marked with the "Diamond"
Jenkins Valves
SINCE 1864

Holding them up to all users of industrial wheels and axles



Day-Evans Iron Works, Knoxville, Tenn.



The Cincinnati

Sent on trial

You can drill shot holes (6 to 8 ft.) in 1½ to 2 minutes with "The Cincinnati" Portable Electric Coal Drill. To prove it to you we will send "The Cincinnati" to you on trial.

You know what such speedy shot hole drilling means. There's no need to argue the advantages of that.

Write us about our trial offer.

The Cincinnati Electrical Tool Co.
1513 Freeman Ave., Cincinnati, Ohio

THE LIPE SPEED REDUCER

Full Planetary Construction

All rotating parts supported on both ends

Torque Cushioning Device reduces Starting Torque

Ratio 4:1 to 200:1

Step Up or Reduce Speed

PATENTED

OTHER LIPE PRODUCTS

Electric Hoists Coil Winding Machines
Flexible Couplings
Special Machinery to Order
Gear Tooth Chamfering Machine

Write for full particulars and the name of our nearest representative

W. C. LIPE, INC.

(Established 1873)

208 So. Geddes Street Syracuse, N. Y., U. S. A.

If the best coal on earth is not well screened
—it is not the best coal on earth!
We build Shaker Screens
EARLINGTON MACHINE WORKS INC. EARLINGTON, KY.

This Spry One-Man Electric Coal Drill, weighing only 44 pounds, can easily be operated as a breast drill. It drills a two-inch hole, 6 ft. in 1 to 2 minutes. *Send for Catalog C. A.*
HOWELLS MINING DRILL CO.
PLYMOUTH, PA., U. S. A.

TIREX
Rubber-Armored Cable and Cord
for portable equipment lighting, etc.
Write for Catalog
Simplex Wire & Cable Co.
New York Boston Chicago
San Francisco
Wears Like a Cord Tire

COAL TIPPLE MACHINERY
"STANDARD" and "JUNIOR" Shaking Screens,
Conveyors, Car Hauls, Steel Tipples, etc.
The Morrow Manufacturing Company
722 E. Tenth St., Wellston, Ohio

Marion
For Shovels, Dredges and Draglines
THE MARION STEAM SHOVEL COMPANY
Marion, Ohio

PENNSYLVANIA CRUSHER COMPANY
Stephen Girard Building, Philadelphia
Put your coal preparation problems up to us.

ROCK DUSTING
The first requisite is a low cost method for pulverizing the material.
Ask us for copy of Rock Dusting Bulletin describing the Raymond Imp. Pulverizer.
Raymond Bros. Impact Pulverizer Co.
1319 No. Branch St. Chicago — 43 Broad St. New York — Cotton Exchange Bldg. Los Angeles

NOTICE is hereby given that all patent rights, existing patents and patent applications relating to coal loading machines heretofore invented by Joseph F. Joy in the United States, Belgium, France, Great Britain, Australia, Austria and Germany are the sole property of
JOY MANUFACTURING COMPANY
Franklin, Pa., U. S. A.

Coal Washing Machines *for* **More Coal Sales at Better Prices**
Montgomery Coal Washing & Mfg. Co.
BIRMINGHAM, ALA.

THE COLODER
The Ultimate in Mechanical Mining Equipment
22 Coloders in the mines of one company loaded over a million-and-a-half tons of coal in 1924
The Coloder Co., Inc.
Columbus, Ohio, U. S. A.

APCO Rock Dusting
With the APCO System every mine can use its own shale for rock dusting. The pulverizing is done with the well-known American Ring-Type Pulverizer. All accessory equipment is of the same high quality. Utmost simplicity. One man operation. No drying required. Write us.
American Pulverizer Co.
St. Louis, Mo.

Use PLAT-O TABLES
For Ore Concentration and Coal Washing
DEISTER MACHINE CO.
Fort Wayne, Ind.

WEBSTER
COAL HANDLING and PREPARATION EQUIPMENT
Shaker Screens, Loading Booms, Picking Tables, Car Retarders, Car Hauls, Rotary Car Dumps, Weigh Baskets, Belt Conveyors, Feeders of all types, Retarding Conveyors, Apron Conveyors, Bucket Elevators, Complete Tipples and Rescreening Plants.
The Webster Mfg. Co., Chicago, Ill.

Clean your Coal by AIR

THE AMERICAN PNEUMATIC ~COAL~ SEPARATOR

American Coal Cleaning Corp.
Welch, W. Va.

Ash Reduction from 25% to 65%
Sulphur Reduction from 25% to 85%
Moisture Reduction from 1% to 50%
Send for Bulletin

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of Water Tube Boilers of continuing reliability

BRANCH OFFICES

BOSTON, 49 Federal Street
PHILADELPHIA, Packard Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., 2001 Magnolia Building
HONOLULU, H. I., Castle & Cooke Building
PORTLAND, ORE., 805 Gasco Building

WORKS
Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

BRANCH OFFICES

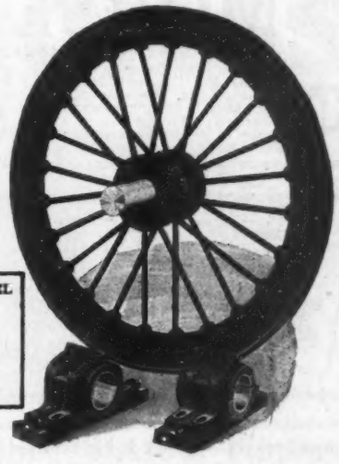
DETROIT, Ford Building
NEW ORLEANS, 521-5 Baronne Street
HOUSTON, TEXAS, 1011-13 Electric Building
DENVER, 435 Seventeenth Street
SALT LAKE CITY, 405-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

Central frogs, switches, switch-stands, crossings, turnouts go a long way toward preventing wrecks in your mine

The Central Frog & Switch Co.
Cincinnati, Ohio

CENTRAL
Track Equipment

Holmes "Super" Sheaves



"HOLMES" SHEAVE WHEEL MADE IN SIZES FROM 4 TO 14 FEET, WITH EITHER PLAIN TURNED GROOVE OR REMOVABLE STEEL GROOVED LINERS

Barring accidents which cause breakage, Holmes Super Sheaves usually last the life of the mine. That's because super strength and ruggedness are built into them at every step in their manufacture.

Send for bulletin

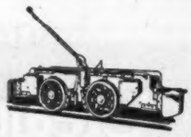
Robert Holmes & Bros., Inc.
Danville, Illinois

SCREENS OF ALL KINDS

Chicago Perforating Co.
2445 West 24th Place
Tel. Canal 1459 CHICAGO, ILL.

WHITCOMB

Storage Battery and Trolley Locomotives



Designed to Work—Built to Overwork

Geo. D. Whitcomb Co. Rochelle, Illinois

DEISTER-OVERSTROM

Diagonal Deck Coal Washing Tables
and
Leahy NO-BLIND Vibrating Screens
THE
DEISTER CONCENTRATOR COMPANY
FORT WAYNE, INDIANA

Ridgway

When Considering
Turbines, Engines, Generators
Motor-generators, Rotary Converters
Synchronous Motors, or Turbo-Blowers
Refer to our Family Group
First issue of each month
Ridgway Dynamo & Engine Co.
Ridgway, Pa.

HERRINGBONE CUT GEARS

MILL DRIVES
FAWCUS
SPUR WORM BEVEL GEARS
SPEED REDUCERS

FAWCUS MACHINE CO. PITTSBURGH, PA.

CEMENT-GUN
TRADE MARK

And the Traylor Mine Type Compressor
See our advertisement in the December 10th issue.
Cement-Gun Co., Inc., Allentown, Pa.

Keystone Electrical Equipment
Golden Glow Headlights
Armature Winding Machines
Cass Commutator Stones
Consult Catalog No. 6
ELECTRIC SERVICE SUPPLIES CO.
PHILADELPHIA 17th and Cambria Sts. NEW YORK 50 Church St. CHICAGO Illinois Merchants Bank Bldg.
Pittsburgh, 839 Oliver Bldg.; Boston, 88 Broad St.; Scranton, 316 N. Washington Ave.; Detroit, General Motors Bldg.; Lyman Tube & Supply Co., Ltd. Montreal, Toronto, Vancouver.

De Laval Steam Turbine Co.
Trenton, N.J.

Steam Turbines, for all speed and steam conditions. Catalog D71.
Double Helical Speed Reducing Gears. Catalog G71.
Centrifugal Pumps, for all capacities. Catalog B71.
Centrifugal Blowers and Compressors. Catalog F71.
Worm Reduction Gears. Catalog R71.
Flexible Couplings. Catalog K71.
Water Wheels. Catalog T71.

MORSE SILENT CHAINS

MORSE CHAIN CO., ITHACA, N. Y., U. S. A.

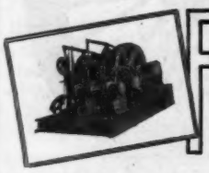
Atlanta, Ga. Baltimore, Md. Birmingham, Ala. Boston, Mass. Charlotte, N. C. Chicago, Ill Cleveland, Ohio
Denver, Colo. Detroit, Mich. Louisville, Ky. Minneapolis, Minn. New Orleans, La. New York City Omaha, Neb.
Philadelphia, Pa. Pittsburgh, Pa. San Francisco, Cal. St. Louis, Mo. Toronto, Ont., Can. Winnipeg, Man., Can.

620

BOYTS PORTER & CO.

CONNELLSVILLE, PA.

Yough Boiler Feed Pumps
Yough Heavy Duty Mine Pumps
Yough Gathering Pumps



FLORY HOISTS

STEAM-ELECTRIC-GASOLINE
A FLORY HOIST FOR EVERY PURPOSE
S. FLORY MFG. CO.
BANGOR, PENNA.

ATLAS

Mine Locomotives

THE ATLAS CAR & MFG. COMPANY
Engineers CLEVELAND, O. *Manufacturers*

Coxe Stokers — Type E Stokers — New Frederick Stokers

A WORLD ORGANIZATION

Completely Covering the Field of Combustion Engineering with Stokers, Pulverized Fuel and Oil Burning Equipment of its own Manufacture.

International Combustion Engineering Corporation
COMBUSTION ENGINEERING CORPORATION
43 Broad Street, New York
QUINN OIL BURNER GREEN STOKER LOPULCO SYSTEMS

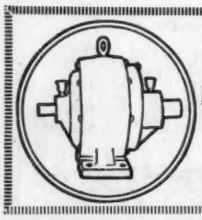
OTTUMWA

Hoists ~ Mine Cars
Sheave Wheels ~ Roller Bearing Trucks
OTTUMWA IRON WORKS, *Ottumwa, Iowa*

NORDBERG

MINE HOISTS-UNDERGROUND LOADERS
HOIST SHEAVES-TRACK SHIFTERS
ENGINES-COMPRESSORS-SPECIAL MACHINERY

MACHINERY NORDBERG MANUFACTURING CO. MILWAUKEE WISCONSIN

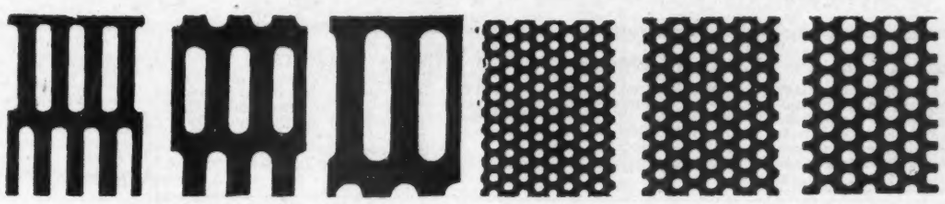


Ganschow

PLANETARY SPUR GEAR SPEED TRANSFORMERS
William Ganschow Company
14 N. Morgan Street - Chicago, Ill.
2002 *CUT GEARS OF ALL KINDS*

PERFORATED METAL

All sizes and shapes of Holes



All kinds and thicknesses of Metal

FOR SCREENING, SIZING and WASHING COAL

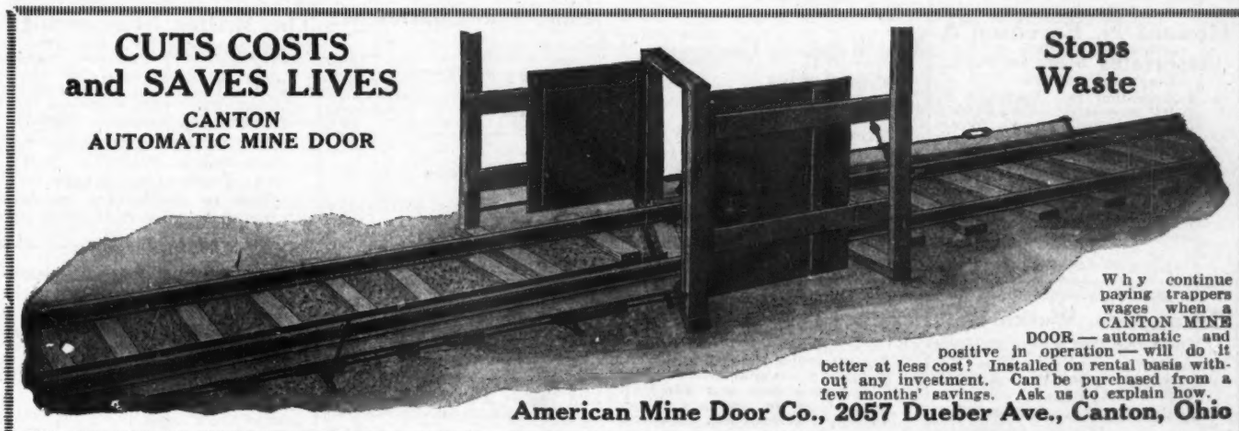
The Harrington & King Perforating Company

5637 Fillmore St., Chicago, Ill., U. S. A. **New York Office: 114 Liberty Street**

CUTS COSTS and SAVES LIVES

CANTON AUTOMATIC MINE DOOR

Stops Waste

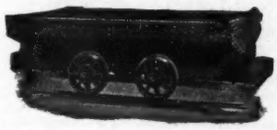


Why continue paying trappers wages when a CANTON MINE DOOR — automatic and positive in operation — will do it better at less cost? Installed on rental basis without any investment. Can be purchased from a few months' savings. Ask us to explain how.

American Mine Door Co., 2057 Dueber Ave., Canton, Ohio

THE LORAIN STEEL COMPANY

Johnstown, Pa.



Manufacturers of steel and Composite mine cars, and all kinds of mine track work.

Sales Offices:

Atlanta Chicago Philadelphia Cleveland Pittsburgh New York

Pacific Coast Representative:

United States Steel Products Company

Los Angeles Portland San Francisco Seattle

Export Representative:

United States Steel Products Company, New York, N. Y.

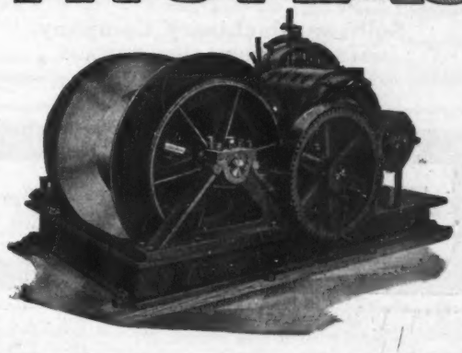
Complete Cars Trucks of all Types

Builders of the Hollow Axle Truck

SOUTHERN WHEEL COMPANY

ST. LOUIS, MO. BIRMINGHAM, ALA.

THOMAS



For Incline, Shaft or Tipple

Thomas Hoists have kept pace with the progress of the coal mining industry. As regularly furnished they are fitted with our patented band friction which operates without a thrust bearing and is located on the opposite end of the drum from the brake. Both friction and brake are composition lined and of ample area.

Thomas Elevator Co.

29 S. Hoyne Ave., Chicago, Ill.

HOISTS

Directory of Consulting Engineers

Allen & Garcia Co.
Designing, Superintendence, Construction. Everything for coal mines; Structures, Mechanical and Electrical Installations, Shaft Sinking, Development, Operation. Examinations-Reports-Appraisals. Isabelle Bldg., Chicago.

Chance, H. M. & Co.
Consulting Mining Engineers and Geologists.
Coal and Iron.
Drexel Bldg., Philadelphia, Pa.

Howard N. Eavenson & Associates *Mining Engineers*
Examination and Valuation of Coal Properties; Coal Plant Design, Construction and Supervision; Concentrated Mining System Plans; Operating Property Improvements; Electrification—Coal and Metal Mines; Power Surveys.
Union Trust Bldg., Pittsburgh, Pa.

Evans, Geo. Watkin
Consulting Coal Mining Engineer
Geological Surveys, Mine Examinations, Valuation Reports, Mine Operations.
L. C. Smith Bldg., Seattle, U.S.A.

C. M. Garland
Consulting & Constructing Engineer. Complete Power Plants. Utilization of Exhaust Steam, Electrification of Mines, Investigations, Reports, Valuations.
First Nat'l Bk. Bldg., Chicago, Ill.

Gottschalk, Chas.
Consulting Mining Engineer
Reports and Appraisals, Coal Lands for Shaft or Steam Shovel Prospected or Investigated.
Citizens Bank Bldg., Evansville, Ind.

The Koppers Company Laboratories
Pittsburgh, Pa.
Examination of Coal for By-Product Recovery, Investigation in By-Product Coke and Gas Manufacture, Ammonia, Tar, Benzols, Gasoline, Refractory Materials.

Krehbiel Company
Engineers—Constructors.
Complete coal mine top works. Electrification of coal mines. Tipples, horizontal screens. Power generation and distribution. Send for catalog C.
730 West Monroe St., Chicago.

Morris Lawrence,
Consulting Chemical and Fuel Engineer. Chemical and Research Tests and Investigations. Coal Preparation. Boiler Water Treatment, Patents. Reports on New Methods and Processes. 301-302 Mears Bldg., Scranton, Pa.

Longyear Company, E. J.
Mining Engineers.
Shaft Sinking, Diamond Core Drilling and Manufacturing. Geological Surveys.
Security Bldg., Minneapolis, Minn.

Means, The Charles M., Co.
Consulting Engineers.
39 Cortlandt St., New York. Oliver Bldg., Pittsburgh.

Other Engineers
have found this publicity worth while. You, too, should find it so.

Porter, Horace C.
Chemical Engineer, Fuel Testing
Coal Valuation and Tests, Ash Fusibility, Gas and By-Product Yields Investigations at Mine or Plant.
1833 Chestnut St., Philadelphia

Godfrey M. S. Tait
Member American Institute Mining and Metallurgical Engineers

A. W. Gaumer
Member American Society Civil Engineers.

Matthew F. Dorsey
Attorney at Law.
Consulting Engineers and Accountants specializing in Valuations and Appraisals of Mining Properties for Federal and State Tax Purposes.
810 Eighteenth Street, N. W., Washington, D. C.
Telephone Main 1738

The Walter Engineering Corporation
Coal Mining Engineers
Examinations and Reports. Associates experienced in Financing, mergers, reorganization, consolidation, income-tax, modern mechanical mining and every phase of development, operation, distribution and marketing.
299 Broadway, New York.

Wilson, Ridgeway R.
Mining Engineer
Victoria, B. C. Canada.

CORE CONTRACTORS
For Diamond Drilling for any mineral—including coal and oil, in any field. Established 1884. Ask for booklet 122-C.
Sullivan Machinery Company
134 SO. MICHIGAN AVE., CHICAGO

Little Giant Power Hammers
For Pick Point and Bit Sharpening and all kinds of Smithing.
Little Giant Wood Lathes—none better.
See our half page ad in the Aug. 6th Number
LITTLE GIANT COMPANY, Mankato, Minn.
(Formerly Mayer Bros.) 102 Rock St.

JATON
Brattice Cloth
FIRE-PROOFING WILL NOT WASH OUT
IT WILL NOT RAVEL
MARINE CANVAS SUPPLY CORP
23-9th St., Brooklyn, N.Y.

B. D. Hampson, Gen. Manager
Punxsutawney Drilling and Contracting Company
DIAMOND DRILL CONTRACTORS
Testing Bituminous Coal Lands a Specialty
Weber Building, Established 1895
PUNXSUTAWNEY, PA. Incorporated 1905

DIAMOND CORE DRILLING
FOUNDATION TESTING
DIAMOND DRILLING & EXPLORATION CO.
C. C. Hoover, Pres.
15th St., and Spring Way, Pittsburgh, Pa.
Telephone Grant 8889-R

MEDART means EVERYTHING in Line Shafting Equipment
THE MEDART COMPANY
(Formerly Medart Patent Pulley Co.)
General Offices and Works: St. Louis, U. S. A.
Office and Warehouse: Cincinnati. Offices: Chicago and Philadelphia

INSULATED WIRES and CABLES
"Okonite," "Manson" and Dundee "A," "B" Tapes
Send for Handbook
THE OKONITE COMPANY
THE OKONITE-CALLENDER CABLE COMPANY, INC.
Factories: Passaic, N. J. Paterson, N. J.
Sales Offices: New York, Chicago, San Francisco, St. Louis, Atlanta, Birmingham, Pittsburgh, Los Angeles, Pettingell-Andrews Co., Boston, Mass, F. D. Lawrence Electric Co., Cincinnati, O. Novelty Electric Co., Phila, Pa.
Can. Rep.: Engineering Materials Limited, Montreal.

Chattanooga Armature Works
REWINDING REPAIRING REBUILDING ELECTRICAL MACHINERY
CHATTANOOGA, TENN

EMPLOYMENT AGENCY

GENERAL engineering agency, Emich Bldg., Pittsburgh, proposals; mining engineers, surveyors, general draftsmen, power engineers, chief electricians, coal buyers, coal sales engineers.

POSITIONS WANTED

EXECUTIVE, experienced in handling bituminous coal mining operations on a large property, as general manager, is open for employment. PW-790, Coal Age, Real Estate Trust Bldg., Phila., Pa.

MINE manager: Fully qualified to handle all details of direct operation and the executive management of bituminous coal mining. PW-793, Coal Age, Leader-News Bldg., Cleveland, Ohio.

POSITION as superintendent or general superintendent, prefer West Virginia, Kentucky or Virginia. PW-792, Coal Age, Leader-News Bldg., Cleveland, Ohio.

BUSINESS OPPORTUNITIES

Wanted Coal Company Stores

Successful company store manager wants to buy or lease good operating stores. Able to finance and manage large proposition or buy part and manage good proposition with reliable coal company. BO-787, Coal Age, Real Estate Trust Bldg., Phila., Pa.

Small Mine For Sale

operating in best section of Elkhorn Field, Pike Co., Ky. Production can be materially increased. Priced right. Write Box 459, Pikeville, Kentucky.

FOR SALE

Going mine in Jefferson County, Pa., electrically equipped. Producing 100 tons daily. Seam averages 4 feet, no partings. Low operating cost. Price for quick sale less than inventory value.

BO-791, Coal Age
Real Estate Trust Bldg., Philadelphia, Pa.

FOR SALE

Developed Coal Property

in West Virginia consisting of 4,000 acres coal. Necessary improvements to produce 1,000 tons daily. 600 tons daily under contract to July 1st and contract can be renewed for a like or larger tonnage indefinitely due to location of mine. Working Red Stone seam. Pittsburgh seam underlying this property has never been opened. Price $650,000. $100,000 cash, balance on terms. For further particulars apply.

BO-780, Coal Age,
Real Estate Trust Bldg., Philadelphia, Pa.

FOR SALE

Rails and Wire

60 lb. Relaying Rails, with angle bars to match, and 000 copper wire, both in No. 1 condition.

THE TOLEDO, FOSTORIA & FINDLAY RAILWAY CO., Fostoria, Ohio

In Replying to "Blind" Ads

be careful to put on envelope the key number in the ad and also local address of office to which reply is sent.

10th Ave. at 36th St., New York
712 Real Estate Trust Bldg., Phila.
359 Leader-News Bldg., Cleveland
7 So. Dearborn St., Chicago, Ill.
883 Mission St., San Francisco

Important

Original letters of recommendation or other papers of value should not be enclosed to unknown correspondents—send copies.

G-31

150 KW. M-G SET

150 kw., 250/275 v., 900 rev. cpd. wd. with interpoles direct connected and mounted on common base with 218 hp., 2200 v., 3 ph., 60 cy., synchronous motor, complete with 3 swbd. panels, practically new. Used 4 months.

200 KW. M-G SET

200 kw., 250 v., 600 rev. Lincoln Generator, direct connected and mounted on common base to a 300 hp., 2300 v., 3 ph., 60 cy., 600 rev. Lincoln Synchronous motor with starting equipment and swbd. Perfect condition.

MINING MACHINES AND LOCO.

2—CE7, Sullivan, 250 v., 6-ft. 6-in. cutter bar.
2—10-ton, 250-v., 36-in. Jeffrey.
2—6-ton, 250-v., 42-in. Goodman.

WHAT HAVE YOU FOR SALE?
MOORHEAD ELEC. MACHY. CO.
House Bldg., Pittsburgh, Pa.

ARCHER ARMSTRONG, INC.

Grand Central Term. Bldg., New York City.
Phones: Vanderbilt 3282-10408.

AIR COMPRESSORS

4—210-ft. Chicago-Pneu. P2DGL gasoline.
1—360-ft. Chicago-Pneu. N8BE with motor.
1—534-ft. Chicago-Pneu. N8BE with motor.
1—600-ft. Blaisdell with motor.
2—788-ft. Chicago-Pneu. OCBE with motor.
2—877-ft. Ing.-Rand CB-2 with motor.
1—877-ft. Ing.-Rand RB with motor.
3—1302-ft. Ing.-Rand PRE-2 dir. con. 2200-60-2 or 3.
2—2830-ft. Ing.-Rand PRE-2 dir. con. 6600-25-3.
1—2830-ft. Ing.-Rand PRE-2 dir. con. 2200-60-3.
2—5000-ft. Centrifugal compressors, 2-5 lb. pressure, direct connected to 75-hp. motor. (New Traylor compressors)

HOISTS

65-hp. DD Clyde with Sw., 220 volt DC.
100-hp. SD Clyde shaft hoist with motor.
200-hp. DD Ottumwa shaft hoist with motor.
5 and 8-ton Westinghouse-Baldwin trolley locomotives, 220 volt DC, 36 to 42 inch gauge.

FOR SALE

MINING MACHINERY

3—SA-1090 Morgan-Gardner Shortwall machines.
1—4½-ton Jeffrey Gathering Locomotive.
1—150-Kw., 250 volt D.C. Generator, Belt Drive.
1—250 HP., 18x18 Skinner Automatic Engine.
1—Harrisburg Engine Direct Connected to General Electric 160 Kw., 275 volt, 160 r.p.m. Generator.

The Hocking Valley Mine Supply Company
Athens, Ohio

BELTING FOR SALE

New, approximately 400 ft. 18-in. width, 5/16-in. thick, rubber faced rubber belting. Will be sacrificed for immediate disposal.

Communicate with

M. L. TUCKER, LENA RUE COAL CO.
Lenarue, Kentucky

FOR SALE

POWER PLANT

All or part interest in a Hydro Electric and Power Plant, located on the Eagle River in Colorado.

PERRY STEELE, Gypsum, Colorado

Opportunity to Secure a Synchronous Convertor At A Saving Of 40%

200 kw. General Electric Mine Type HCC, 250 v., 800 amps. compound wound interpole D.C., 6 ph., 60 cy., 1200 r.p.m. unit, complete with brush lifting device, end play device, speed limit device and squirrel cage winding for self starting from A.C. end. This unit has been completely overhauled, is in condition equal to new and ready for immediate shipment.

The Fuerst-Friedman Co.
Cleveland, Ohio

SYNCHRONOUS MOTOR GENERATOR SETS

1—65 kw., 250-v. D.C., 2200-v., 3-ph., 60-cy. A.C. Milwaukee Westinghouse.
1—150 kw., 250-v. D.C., 2200-v., 6-ph., 60-cy. A.C. Westg. rotary.
2—200 kw., 275-v. D.C., 2200/6600-v., 3-ph., 60-cy. A.C. Westg. rotary.

DIRECT CONNECTED STEAM ENGINE GENERATOR SETS

1—50 kw., 250-v. D.C. General Electric Skinner.
1—75 kw., 250-v. D.C. Crocker-Wheeler Steam Engine Co.
1—150 kw., 250-v. D.C. Burke Harrisburg.
1—250 kw., 250-v. D.C. General Electric Ball.

MINING MACHINES

1—250-v. D.C., 27-A Jeffrey Breast Machine.
8—250-v. D.C. CE-7 Sullivan Shortwall Machines.
3—250-v. D.C. 35-B Jeffrey Shortwall Machines.
2—250-v. D.C., 28-A Jeffrey Shortwall Machines.
6—250-v. D.C. 12-DA Goodman Shortwall Mining Machines.
1—250-v. D.C. 112-AA Goodman Shortwall Mining Machine.
1—250-v. D.C. 12-AB Goodman Shortwall Mining Machine.
2—220-v., 3-ph., 60-cy. Sullivan or Goodman A.C. Machine.
Track gauge can be changed to suit your requirements.

LOCOMOTIVES

2—3-ton, 42-in. gauge, 250-v. D.C. 1600-K Goodman Gathering Locomotives.
4—4-ton, 39-in. gauge, 250-v. D.C. Morgan Gardner Gathering Locomotives.
1—5-ton, 36-in. gauge, 250-v. D.C. General Electric Gathering Locomotive.
1—6-ton, 30-in. gauge, 250-v. D.C. Jeffrey haulage locomotive.
4—7-ton, 36-in. gauge, 250-v. D.C. Goodman haulage or gathering locomotives.
2—7-ton, 38 or 42-in. gauge, 250-v. D.C. Westinghouse Bar Steel Frame Locomotives.
2—8-ton, 38 or 42-in. gauge, 250-v. D.C. Westinghouse Bar Steel Frame Locomotives.
1—8-ton, 36-in. gauge, 250-v. D.C. General Electric Locomotive, with reel.
3—10-ton, 36-in. gauge, 250-v. D.C. Jeffrey Haulage Locomotives.

Duquesne Electric & Mfg. Company
Pittsburgh, Penna.

FOR SALE

COAL CRUSHER

Jeffery Single Roll, size 30x30, practically new, at a greatly reduced price.

COMMERCIAL COAL MINING CO.,
Expedit, Pa.

"HONESTLY REBUILT" ELECTRICAL MACHINERY

MILLER-OWEN ELECTRIC CO., Inc.
PITTSBURGH, PENNA.

SAVE 30% to 50% ON
RAILS-LOCOMOTIVES-CARS

Get our prices on H-M Select Guaranteed Used Railway Equipment and H-M Relaying Rails. 30% to 50% saving. All weights. Stocks at our 4 yards. Prompt shipment made from yard nearest destination saves freight.

Locomotives and cars of every type in serviceable condition.

Hyman-Michaels Company
People's Gas Bldg., Chicago
New York St. Louis Pittsburgh San Francisco

FOR SALE
5—General Electric Gathering Type
LOCOMOTIVES
6-ton motors, Class LSBT-2T6C, 250 v., 44 gauge track; overall height 44 in. above rail. Equipped with Jeffrey reel Type CS No. 844. Locomotives are in good condition and are now in operation. On account of standardizing on another make of locomotive will make a very attractive price.
Address,
Milburn By-Products Coal Company
Milburn, West Va.

IMMEDIATE SHIPMENTS
RAILS
NEW & RELAY
SPECIALS
550 tons 40 lb. relayers
450 tons 60 lb. relayers
500 tons 80 lb. relayers
300 tons 100 lb. relayers
Also—
FROGS & SWITCHES
SPIKES & BOLTS
TIE PLATES
INDUSTRIAL TRACK ACCESSORIES
MORRISON & RISMAN CO. INC.
BUFFALO, N.Y.

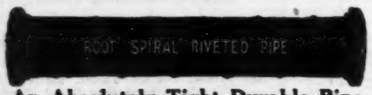
Centrifugal Pumps
3—2½-in. Type A American Centrifugal.
2—3-in. Type I American Centrifugal.
2—3-in. Type C American Centrifugal.
5—3-in. Baker Centrifugal.
48—4-in. Baker Centrifugal.
6—5-in. Goulds Centrifugal.
41—6-in. Baker Centrifugal.
1—8-in. Allis-Chalmers Type S Centrifugal.
6—14-in. Allis-Chalmers Type S Centrifugal direct connected to 300 hp. steam turbine.
5—14-in. Worthington Class B Double Suction direct connected to 300 hp. motor.
6—16-in. Allis-Chalmers Type S direct connected to 300 hp. motor.
Nashville Industrial Corporation
Old Hickory, Tennessee

FOR SALE
SHAKER SCREEN
Three Track Parker. Weigh pan and scales. New in 1921. Price $1200.
THE EUREKA COAL COMPANY
Terre Haute, Ind.

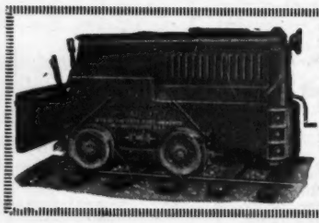
RAILS
Complete stock, all section Relaying Rails. Get in touch with us by 'phone or wire for your requirements.
LOUIS COHEN & SON, Wilkes-Barre, Pa.

RAILS, MINE CARS
100 good serviceable 36-in. gauge cars; price $35.00; also limited quantity of other gauges at attractive price. Avail yourselves of our large stock of new and relaying light rail. Also carry stock of copper wire new and second hand; prices cheerfully quoted.
M. K. FRANK
Union Trust Bldg., Pittsburgh, Pa.
Park Row Bldg., N. Y.

RAILS
SWITCHES AND FROGS
LOCOMOTIVES AND CARS
L. A. Green Railway Equipment Co.
First National Bank Bldg., Pittsburgh, Pa.

One-Fifth The Weight of Cast Iron Pipe


One-Third The Weight of Wrought Pipe
An Absolutely Tight Durable Pipe
Fully 50% stronger than Straight Riveted Pipe of equal thickness. Light weight and simplicity of bolted connections results in low handling and installation expense. Suitable for Conveying Water, Air, Gas, Exhaust Steam and Wood Pulp.
Abendroth & Root Mfg. Co. Sales Office: Woolworth Bldg., N. Y.
Pipe Specialists Continuously Since 1867


PLYMOUTH
Gasoline Locomotives
For mine use and general industrial haulage. Made in 3 to 20 ton sizes and in any track gauge. Write for Catalogs and Performance Bulletins.
THE FATE-ROOT-HEATH CO.
Plymouth, Ohio

Acid-Proof Wood Pipe for mine water

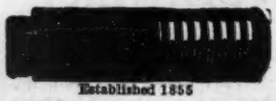
The Michigan Pipe Co.
Bay City Michigan

SPECIFY THE BEST
A Complete Line of the Highest Grade Track Materials
SWEET'S STEEL CO

FOR YOUR MINES
Write for Descriptive Catalog.
WILLIAMSPORT, PA.

STANDARD
Made in the Heart of the Mining Regions
WOOD PIPE
Save freight, get quicker deliveries and get wood pipe that stands the gaff. Write, wire or phone.
Standard Wood Pipe Co., Williamsport, Pa.

Automatic Aerial Tramway
does your work quickly-efficiently-economically
Interstate Equipment Corp.
25 Church St., New York City

Replace your Iron Pipe with
WYCKOFF WOOD PIPE

Been in use over 68 years. Used extensively now by the vast majority of mines. Unaffected by acids, fumes, or electrolysis. Investigate.
Established 1855
A. Wyckoff & Son Co.
Elmira, N. Y.

ANACONDA
COPPER WIRE
ANACONDA COPPER MINING COMPANY
Conway Building, Chicago, Ill.
THE AMERICAN BRASS COMPANY
General Offices: Waterbury, Conn.

GOULDS

A TYPE FOR EVERY SERVICE

Bulletins on request

THE GOULDS MANUFACTURING COMPANY
Seneca Falls, N. Y.

PUMPS

Learn How to Increase Your Gathering Efficiency

—by writing for details of performance and operation of this wonderful pumping unit. Only two moving parts, easily lubricated, long-lived and fool proof.

Send today for literature.

POWER EQUIPMENT COMPANY
(Chas. A. Saints)
Oliver Building, Pittsburgh, Pa.

VIKING GATHERING PUMP

Coal Mine Equipment Co., Pittsburgh, Pa. Coffin & Smith, Scranton, Pa. LaLance Equipment Company, Huntington, West Va. The Cameron Equipment Co., Cleveland, Ohio. General Machinery Co. Birmingham, Alabama.

Equip Your Mine With Steel

Steel Mine Timbers
Steel Cross Ties
Wheels-Axles
Rails-and
Accessories

Carnegie Steel Company
PITTSBURGH, PENNA.

ALL GEARS ENCLOSED

That means safety to your workmen and protection for the pumping mechanism, too. Self-oiling, quiet running, durable—an ideal mine pump, the Deming Oil-Rite.

Deming "Jupiter Oil Rite" Enclosed Gear, Mine Pump.

Complete Mine Pump Bulletin on Request

The Deming Co. (Est. 1882) Salem, Ohio
Distributors in All Principal Cities

Deming

HAND AND POWER PUMPS FOR ALL USES

ALDRICH

THE ALDRICH PUMP COMPANY
Allentown, Penna.

VERTICAL HORIZONTAL MINE TRIPLEX QUINTUPLEX

PUMPS

CHECK VALVES

STRAINERS
PIPE FITTINGS
for
Centrifugal Mine Pumps

BARRETT, HAENTJENS & CO. HAZLETON, PA.

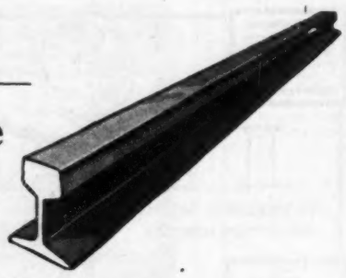
Built for the long, hard run

The "Channel-Bar" truck—the cold rolled steel floating axles with dust proof bearings—the steel plate center bumpers—these features explain in part the Irwin capacity for long service.

Irwin Foundry & Mine Car Co.
Irwin, Pa.

IRWIN

Get this Straight— and Save Costs!



Absolutely straight rails of the proper analysis steel for mine traffic, ready to lay and *stay laid*, will save money in replacements, derailments and labor costs.

Don't use rails of uncertain quality and have to replace them within a year.

Send for Catalog and Bulletins.

The West Virginia Rail Co.
Huntington, W. Va.

W.VA.RAIL

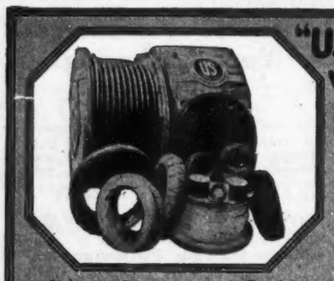
B&B Two-Bucket Aerial Tramways

for economical haulage of coal and disposal of waste

BRODERICK & BASCOM ROPE CO.,
St. Louis, Mo.
New York Office and Warehouse: 76 Warren St.
Western Office: Seattle, Wash.
Factories: St. Louis and Seattle

Manufacturers of famous Yellow Strand and other reliable wire ropes.

JB521



"U.S." PARACORE Wires and Cables
TOP QUALITY for UNDERGROUND WORKINGS

Write for catalog C-24

United States Rubber Company
1790 Broadway New York
Branches in Every Industrial Center

Trade Mark

Roebling Wire Rope

John A. Roebling's Sons Co.
TRENTON, NEW JERSEY.

Commissary Coupon Books

We confine ourselves exclusively to the manufacture of coupon books, and have the necessary experience and modern equipment to furnish first-class and absolutely accurate books at minimum cost.

Write us for illustrated folder, samples and prices.

Southern Coupon Co.
Birmingham, Ala.

"Hercules" (Red-Strand) Wire Rope

is backed by a long service record. It has actually proven that it is an economical rope for heavy work of all kinds.

Made Only By

A. Leschen & Sons Rope Company
St. Louis
New York Chicago Denver San Francisco

Hazard Wire Rope Withstands Every Wear-test.

Increasingly heavy loads and rapid acceleration; the grinding and tearing effect of hard slope conditions; the severe bending stresses set up as the Ropes run over the drums and sheaves; problems such as these are successfully solved by Hazard Wire Rope.

HAZARD MFG. CO.
Wilkes-Barre, Pa.

HAZARD

WHAT AND WHERE TO BUY

A Classified Index of Advertisers in this Issue

This index is published as a convenience to the reader. Every care is taken to make it accurate, but *Coal Age* assumes no responsibility for errors or omissions.

For Alphabetical Index See Last Page

Aerial Tramways
American Steel & Wire Co.
Broderick & Bascom Rope Co.
Interstate Equipment Corp.
Leschen & Sons Rope Co., A.

Air Aftercoolers
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.

Air Guns
Jenkins Bros.

Air Receivers
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.

Appraisals
Allen & Garcia Co.

Armature Repair Machinery
Electric Service Supplies Co.

Armatures and Field Coils
Chattanooga Armature Wks.

Ash Handling Machinery
Combustion Engr'ing Corp.

Augers, Coal (See Drills)

Banking Institutions
Coal & Iron National Bank

Bars, Iron and Steel
American Car and Foundry Co.

Bars, Steel
Carnegie Steel Co.
Central Steel Co.
Ryerson & Son, Inc., Jos. T

Battery Boxes
Paragon Electric Co.

Bearings, Ball and Roller
Hyatt Roller Bearing Co.
Timken Roller Bearing Co.

Bearings, Tapered
Timken Roller Bearing Co.

Bearings, Thrust
Timken Roller Bearing Co.

Belting, Silent Chain
Morse Chain Co.

Belts, Conveyor
Jeffrey Mfg. Co.
Link-Belt Co.
U. S. Rubber Co.
Webster Mfg. Co.

Belts, Elevator
U. S. Rubber Co.

Belts, Transmission
U. S. Rubber Co.

Bit Sharpeners
Ingersoll-Rand Co.
Little Giant Co.
Sullivan Machinery Co.

Bit Steel & Mining Mch. Bits
Pgh. Knife & Forge Co.

Blasting Supplies
Du Pont de Nemours & Co., Inc., E. I.

Blowers, Centrifugal
De Laval Steam Turbine Co
Ingersoll-Rand Co.

Boilers, Water Tube
Babcock & Wilcox Co.

Bolts, Nuts and Rivets
American Car and Foundry Co.

Bonding Machines
Una Welding & Bonding Co.

Books, Coupon
Southern Coupon Co.

Books, Technical
McGraw-Hill Book Co., Inc.

Box Car Loaders
Fairmont Mining Mchy. Co.
Link-Belt Co.

Brattice Cloth
Marine Canvas Supply Corp.

Breaker Machinery
Vulcan Iron Works
Wilmot Engineering Co.

Buckets
Pittsburgh Coal Washer Co.

Buckets, Clamshell
Link-Belt Co.

Buckets, Coal Handling
Link-Belt Co.

Buckets, Elevator
Hendrick Mfg. Co.
Link-Belt Co.
Webster Mfg. Co.

Cable, Portable
U. S. Rubber Co.

Cableways
Flory Mfg. Co., S.
Interstate Equipment Corp.

Cages
Morrow Mfg. Co.
Vulcan Iron Works

Cages, Self-Dumping
Car-Dumper & Equip. Co.

Cagers, Automatic
Holmes & Bros., Inc., Robt.

Canvas Products
Marine Canvas Supply Corp.

Car Controls
Car-Dumper & Equip. Co.

Car Dumpers, Rotary
Car-Dumper & Equip. Co.

Car Dumps
Pittsburgh Coal Washer Co.

Car Hauls
Jeffrey Mfg. Co.
Link-Belt Co.
Pittsburgh Coal Washer Co.
Webster Mfg. Co.

Car Irons
American Car and Foundry Co.

Car Loaders (See Box Car Loaders)

Car Lubricants
Hulburt Oil & Grease Co.

Cars, Mine Air Compressor
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.

Car Retarders
Fairmont Mining Mchy. Co
Webster Mfg. Co.

Cars and Car Wheels
American Car and Foundry Co.
Day-Evans Iron Wks., Inc.
Lorain Steel Co.
Ottumwa Iron Works
Sanford-Day Iron Works
Southern Wheel Co.
Treadwell Engineering Co.
Watt Mining Car Wheel Co.

Cars, Roller Bearings for
Hyatt Roller Bearing Co.

Castings
Sanford-Day Iron Works
Vulcan Iron Works

Castings, Iron and Steel
Treadwell Engineering Co.

Cement-Guns
Cement-Gun Co., Inc.

Chains
Jeffrey Mfg. Co.
Link-Belt Co.
Pittsburgh Coal Washer Co.
Ryerson & Son, Inc., Jos. T.

Chemicals
Du Pont de Nemours & Co., Inc., E. I.

Chutes
Fairmont Mining Mchy. Co.
Phillips M. & M. Supply Co.
Sanford-Day Iron Works

Clamps, Trolley Wire
Electric Railway Equip. Co.
Ohio Brass Co.

Coal Air Cleaning Plants
Roberts & Schaefer Co.

Coal & Ash Handling Mchry.
Jeffrey Mfg. Co.
Link-Belt Co.
Webster Mfg. Co.

Coal Cleaning Machinery
American Coal Cleaning Corp.
Roberts & Schaefer Co.

Coal Drills, Electric & Pneu.
Chicago Pneumatic Tool Co.
Howells Mining Drill Co.

Coal Handling Machinery
Fairmont Mining Mchy. Co.
Holmes & Bros., Inc., Robt.
Roberts & Schaefer Co.

Coal Mining Plants
Link-Belt Co.
Roberts & Schaefer Co.
Webster Mfg. Co.

Coal Preparation Machinery
American Coal Cleaning Corp.

Coal Storage and Rehandling Machinery
Fairmont Mining Mchy. Co.
Link-Belt Co.

Commutators
Chattanooga Armature Wks.

Compressors, Air
Allis-Chalmers Mfg. Co.
Cement-Gun Co., Inc.
Chicago Pneumatic Tool Co.
Gould's Mfg. Co.
Ingersoll-Rand Co.
Sullivan Machinery Co.

Concentrators
Deister Concentrator Co.
Deister Machine Co.

Concrete Construction
Cement-Gun Co., Inc.

Concrete Finishing Tools
Cement-Gun Co., Inc.

Condensers
Ingersoll-Rand Co.

Consulting Engineers (and see Directory of Consulting Engineers, page 28)
Allen & Garcia Co.

Conveyors, Chain Flight
Link-Belt Co.
Webster Mfg. Co.

Conveyors, Coal
Conveyor Sales Co., Inc.
Fairmont Mining Mchry. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Marion Mch. F. & S. Co.
Pittsburgh Coal Washer Co.
U. S. Rubber Co.
Webster Mfg. Co.

Conveyors, Underground
Conveyors Sales Co., Inc.

Couplings
American Car and Foundry Co.

Couplings, Flexible
Ganschow Co., Wm.
Lipe, Inc., W. C.

Cranes, Locomotive
Link-Belt Co.

Crossing (See Switches, Frogs and Crossings)

Crushers, Coal
American Pulverizer Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Marion Mch. F. & S. Co.
Pennsylvania Crusher Co.
Pittsburgh Coal Washer Co.
Raymond Bros. Impact Pulverizer Co.
Vulcan Iron Works
Webster Mfg. Co.

Crushers, Rock
Raymond Bros. Impact Pulverizer Co.

Cutter Lubricants
Hulburt Oil & Grease Co.

Dealers' Machinery (Rail, Pipe and Miscellaneous Equipment)
Allegheny Equip. Corp.
Archer Armstrong, Inc.
Cohen & Son, L.
Duquesne Elec. & Mfg. Co.
Frank, M. K.
Green Railway Equip. Co.
L. A.
Hyman-Michaels Co.
Miller-Owen Electric Co.
Moorhead Elec. Mchry. Co.
Moorison & Risman Co., Inc.
Myers & Associates, J. N.
Nashville Industrial Corp.
Sherwood, E. C.

Diamond Core Drill, Cont'ing
Diamond Drilling & Exp. Co.
Punxsutawney D. & C. Co.
Sullivan Machinery Co.

Dies, Plain & Form Forging
Little Giant Co.

Drafting Material (See Eng. Instruments and Supplies)

Dredges
Marion Steam Shovel Co.

Driers, Sand
Electric Service Supplies Co.

Drills, Air
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.
Sullivan Machinery Co.

Drills, Core
Chicago Pneumatic Tool Co.
Diamond Drilling & Exp. Co.
Ingersoll-Rand Co.
Sullivan Machinery Co.

Drills, Electric
Chicago Pneumatic Tool Co.
Cincinnati Electrical Tool Co.
Diamond Machine Co.
Howells Mining Drill Co.
Jeffrey Mfg. Co.
Sullivan Machinery Co.

Drills Electric (Portable)
Chicago Pneumatic Tool Co.
Cincinnati Electrical Tool Co.

Drills, Power
Chicago Pneumatic Tool Co.

Drills, Rock
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.

Drives, Silent Chain
Morse Chain Co.

Dumps, Crossover
Sanford-Day Iron Works

Dumps, Rotary
Link-Belt Co.
Webster Mfg. Co.

Dynamite & High Explosives (See Explosives)

Dynamos (See Generators)

Electric Haulage Supplies
Electric Service Supplies Co.

Electrical Equipment, Used
Chattanooga Armature Wks.
Duquesne Elec. & Mfg. Co.
Miller-Owen Elec. Co.

Electrification, Mine
Allen & Garcia Co.

Elevators and Conveyors
Jeffrey Mfg. Co.
Link-Belt Co.
Montgomery Coal Washing & Mfg. Co.
Pittsburgh Coal Washer Co.
Webster Mfg. Co.

Engineering Counsel
Allen & Garcia Co.

Engineering & Technical Books
McGraw-Hill Book Co., Inc.

Engines, Corliss
Vulcan Iron Works

Engines, Hoist & Haulage
Holmes & Bros., Inc., Robt.
Vulcan Iron Works

Engines, Oil
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.

Engines, Steam
Chicago Pneumatic Tool Co.

Engines, Steam, Four Valve
Ridgway Dynamo & Eng. Co.

Engines, Steam Single Valve
Ridgway Dynamo & Eng. Co.

Engines, Steam, Una-Flow
Nordberg Mfg. Co.
Ridgway Dynamo & Eng. Co.

Excavating Machinery
Marion Steam Shovel Co.

Explosives
Du Pont de Nemours & Co., Inc., E. I.

Explosives, Permissable
Du Pont de Nemours & Co., Inc., E. I.

Fans, Ventilating
Jeffrey Mfg. Co.
Vulcan Iron Works

Fittings, Wire Rope (See Rope Wire)

Flooring, Steel
Hendrick Mfg. Co.

Frogs, Cast
West Virginia Rail Co.

Furnaces
Combustion Eng'r'g Corp.

Gage Cocks
Jenkins Bros.
Ohio Brass Co.

Gages, Water Boiler and Locomotive
Ohio Brass Co.

Gaskets
Jenkins Bros.

Gear Cases
Electric Service Supplies Co.

Gears
Aldrich Pump Co.
Fawcus Machine Co.
Ganschow Co., Wm.
James Mfg. Co., D. O.
Lipe, Inc., W. C.
Medart Co.
Tool Steel Gear & Pinion Co.
Vulcan Iron Works

Gears, Spur, Speed Reducing
Ganschow Co., Wm.

Gears, Worm Speed Reducing
De Laval Steam Turbine Co.

Generator, A.C. & D.C.
Ridgway Dynamo & Eng. Co.

Generators and Generating Units
Allis-Chalmers Mfg. Co.
Ridgway Dynamo & Eng.Co

Grates, Traveling
Combustion Eng'ring Corp.

Grating, Steel
Hendrick Mfg. Co.

Greases
Hulburt Oil & Grease Co.
Ohio Grease Co.
Sanford-Day Iron Works
Waverly Oil Works Co.

Grinders, Portable
Chicago Pneumatic Tool Co.

Hammers, Power
Little Giant Co.
Sullivan Machinery Co.

Hangers (See Pulleys)

Headlights, Arc & Incand.
Ohio Brass Co.

Headlights, Locomotive
Electric Service Supplies Co.

Heaters, Air
Combustion Eng'r'g Corp.

Heaters, Electric Rivet
American Car and Foundry Co.

Hitchings, Mine Car
Pgh. Knife & Forge Co.

Ho'st, Lubricants
Hulburt Oil & Grease Co.

Hoists
Flory Mfg. Co., S.

Hoists, Electric
Allis-Chalmers Mfg. Co.
Diamond Machine Co.
Holmes & Bros., Inc., Robt.
Lipe, Inc., W. C.
Link-Belt Co.
Nordberg Mfg. Co.
Ottumwa Iron Works
Thomas Elevator Co.
Vulcan Iron Works

Hoists, Mine, Steam & Elec.
Treadwell Engineering Co.

Hoists, Portable
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.
Sullivan Machinery Co.

Hoists Room
Treadwell Engineering Co.

Hoists, Skip
Allen & Garcia Co.

Hoists, Steam
Allis-Chalmers Mfg. Co.
Nordberg Mfg. Co.
Ottumwa Iron Works
Thomas Elevator Co.
Vulcan Iron Works

Hose, Air
Chicago Pneumatic Tool Co.
U. S. Rubber Co.

Hose, Fire
U. S. Rubber Co.

Hose, Steam
U. S. Rubber Co.

Hydraulic Machinery
Allis-Chalmers Mfg. Co.

Incline Plane Machinery
Fairmont Mining Mchry. Co.
Sanford-Day Iron Works

Insulators, Section
Electric Railway Equip. Co.

Jointing, Asbestos
Jenkins Bros.

Lathes, Wood & Metal
Little Giant Co.

Lightning Arresters
Electric Service Supplies Co.

Loaders, Box Car (See Box Car Loaders)

Loaders, Mine Car
Coloder Co., Inc.
Jeffrey Mfg. Co.
Link-Belt Co.

Loading Apparatus
Coloder Co., Inc.
Diamond Machine Co.

Loading Booms
Fairmont Mining Mchry. Co.
Jeffrey Mfg. Co.
Link Belt Co.
Montgomery Coal Washing & Mfg. Co.
Pittsburgh Coal Washer Co.
Webster Mfg. Co.

Loading Machines
Coloder Co., Inc.
Joy Manufacturing Co

Loading Machines, Underground
Joy Manufacturing Co.
Nordberg Mfg. Co.

Locomotive Tires
Midvale Co.

Locomotives, Compressed Air
Porter Co., H. K.
Vulcan Iron Works

Locomotives, Electric
Jeffrey Mfg. Co.
Vulcan Iron Works

Locomotives, Gasoline
Fate-Root-Heath Co.
Vulcan Iron Works
Whitcomb & Co., Geo. D.

Locomotives, Geared
Lima Locomotive Wks., Inc.

Locomotives, Steam
Lima Locomotive Wks. Inc.
Porter Co., H. K.
Vulcan Iron Works

Locomotives, Storage Battery
Jeffrey Mfg. Co.
Vulcan Iron Works
Whitcomb Co., Geo. D.

Lubricants
Hulburt Oil & Grease Co.
Ohio Grease Co.
Waverly Oil Works Co.

Lubricators
Hulburt Oil & Grease Co.
Ohio Grease Co.
Waverly Oil Works Co.

Machinery, Special
Lipe, Inc., W. C.
Vulcan Iron Works

Machine, Coal Testing (See Coal Testing Machines)

Mechanical Loaders
Coloder Co., Inc.

Mine Construction Service
Allen & Garcia Co.

Mine Doors, Automatic
American Mine Door Co.

Mine Timbers, Steel
Carnegie Steel Co.

Mining Equipment
Conveyor Sales Co., Inc.

Mining Machines
Jeffrey Mfg. Co.
Sullivan Machinery Co.

Motor Generators
Ridgway Dynamo & Eng. Co

Motors
Allis-Chalmers Mfg. Co.

Nitrogen
Linde Air Products Co.

Oil & Grease Cups
Hulburt Oil & Grease Co.
Ohio Grease Co.

Oils
Waverly Oil Works Co.

Oxygen in Cylinders
Linde Air Products Co.

Packing
Jenkins Bros.
U. S. Rubber Co.

Paints
Du Pont de Nemours & Co., Inc., E. I.

Perforated Metals
Harrington & King Perforating Co.

Picking Tables
Fairmont Mining Mchry. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Montgomery Coal Washing & Mfg. Co.
Pittsburgh Coal Washer Co.
Webster Mfg. Co.

Pipe
American Car and Foundry Co.
Michigan Pipe Co.
Ryerson & Son, Inc., Jos. T.

Pipe, Cast Iron
Cast Iron Pipe Publicity Bureau

Pipe Cutting and Threading Machinery
Treadwell Engineering Co.

Pipe, Spiral Riveted
Abendroth & Root Mfg. Co.

Pipe, Wood
Standard Wood Pipe Co.
Wyckoff & Son Co., A.

Pipe, Wrought Iron
Reading Iron Co.

Plates, Steel
Carnegie Steel Co.

Pneumatic Coal Separators
American Coal Cleaning Corp.
Roberts & Schaefer Co.

Powder, Blasting
Du Pont de Nemours & Co., Inc., E. I.

Power Plants
Allen & Garcia Co.

Power Transmission Mchry.
Jeffrey Mfg. Co.
Link-Belt Co.
Morse Chain Co.
Webster Mfg. Co.

Pulleys, Shafting and Hangers
Electric Railway Equip. Co.
Hyatt Roller Bearing Co.
Medart Co.

Pulverized Fuel Equipment
Combustion Eng'ring Corp.

Pulverizers, Coal and Coke
American Pulverizer Co.
Jeffrey Mfg. Co.
Raymond Bros. Impact Pulverizer Co.

Pulverizers, Rock
Raymond Bros. Impact Pulverizer Co.

Pump Plungers
Aldrich Pump Co.
Birdsboro Steel Foundry & Machine Co.

Pumps, Boiler Feed
Boyts, Porter & Co.
Cameron Steam Pump Wks.
A. S. (Ingersoll-Rand Co.)
Barrett, Haentjens & Co.
Deming Co.

Pumps, Centrifugal
Allis-Chalmers Mfg. Co.
Barrett, Haentjens & Co.
Cameron Steam Pump Wks.
A. S. (Ingersoll-Rand Co.)
De Laval Steam Turbine Co.
Goulds Mfg. Co.

Pumps, Gathering
Boyts, Porter & Co.
Power Equipment Co.

Pumps, Mine
Aldrich Pump Co.
Boyts, Porter & Co.
Deming Co.

Pumps Pneumatic Air Lift
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.
Sullivan Machinery Co.

Pumps, Power
Boyts, Porter & Co.
Deming Co.
Fairmont Mining Mchry. Co.

Pumps, Rotary
Power Equipment Co.

Pumps, Vacuum
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.
Sullivan Machinery Co.

Rail Bonds
Electric Service Supplies Co.
Ohio Brass Co.
Una Welding & Bonding Co.

Rails and Rail Joints
Carnegie Steel Co.
Ryerson & Son, Inc., Jos. T.
Sweet's Steel Co.
West Virginia Rail Co.

Rails, Extension
Midland Steel Products Co.

Rescreeners
Allen & Garcia Co.

Rock Dusting Machines
Diamond Machine Co.

Roller Bearings (See Bearings, Ball & Roller)

Rope, Manila & Jute
Broderick & Bascom Rope Co.

Rope, Transmission
Broderick & Bascom Rope Co.

Rope, Wire
American Steel & Wire Co.
Broderick & Bascom Rope Co.
Hazard Mfg. Co.
Leschen & Sons Rope Co., A.
Roebling's Sons Co., J. A.
Ryerson & Son, Inc., Jos. T.

School and Colleges (See Consulting Engrs. Directory, page 28)

Scraper Loaders
Diamond Machine Co.

Screens and Perforated Sheeting
Chicago Perforating Co.
Deister Concentrator Co.
Earlington Machine Wks.
Harrington & King Perforating Co.
Hendrick Mfg. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Marion Mch. F. & S. Co.
Montgomery Coal Washing & Mfg. Co.

Screens, Shaker
Earlington Machine Wks.
Fairmont Mining Mchry. Co.
Pittsburgh Coal Washer Co.

Screens, Vibrating
Deister Concentrator Co.

Second-Hand Equipment (See Searchlight Section)
Allegheny Equip. Corp.
Archer Armstrong, Inc.
Cohen & Son, L.
Du Pont de Nemours & Co., Inc., E. I.
Duquesne Elec. & Mfg. Co.
Frank, M. K.
Green Railway Equip. Co., L. A.
Hyman-Michaels Co.
Miller-Owen Electric Co.
Moorhead Elec. Mchry. Co.
Moorison & Risman Co., Inc.
Myers & Associates, J. N.
Nashville Industrial Corp.
Sherwood, E. C

Shapes, Structural Steel
Carnegie Steel Co.

Sheaves and Rollers
Day-Evans Iron Works
Medart Co.
Sanford-Day Iron Works
Vulcan Iron Works

Shovels, Electric
Marion Steam Shovel Co.

Shovels, Gasoline
Marion Steam Shovel Co.

Shovels, Steam
Marion Steam Shovel Co.

Signal Systems
Electric Service Supplies Co.

Speed Reducers
Ganschow Co., Wm.

Splices, Cable
American Mine Door Co.

Splices, Trolley Wire
American Mine Door Co.
Ohio Brass Co.

Sprocket Wheels
Jeffrey Mfg. Co.
Jenkins Bros.
Link-Belt Co.
Medart Co.
Morse Chain Co.
Webster Mfg. Co.

Steps, Ladder & Stair, Non-Slip
Hendrick Mfg. Co.

Stokers, Hand
Combustion Engr'ing Co.

Stokers, Mechanical
Babcock & Wilcox Co., The
Combustion Engr'ing Co.

Surveying Instrument (See Engineering Instruments and Supplies)

Switches, Frogs and Crossings
Central Frog & Switch Co.
Sweet's Steel Co.
Weir Kilby Corp.
West Virginia Rail Co.

Tables, Coal Washing
Deister Concentrator Co.
Deister Machine Co.

Tape, Friction
U. S. Rubber Co.

Tapes, Insulating
Okonite Co., The

Tape, Splicing Compound
U. S. Rubber Co.

Tarpaulins
Marine Canvas Supply Corp.

Telephone Equipment
Paragon Electric Co.
Rome Wire Co.

Telephones, Mines
Electric Service Supplies Co.

Testing Laboratories (See Consulting Engs. Directory)

Ties, Steel
Carnegie Steel Co.
Fairmont Mining Mchry. Co.
Sweet's Steel Co.
West Virginia Rail Co.

Tipples and Tipple Equipt.
Allen & Garcia Co.
Fairmont Mining Mchry Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Marion Mch. F. & S. Co.
Pittsburgh Coal Washer Co.
Roberts & Schaefer Co.
Webster Mfg. Co.

Tires, Truck
U. S. Rubber Co.

Track Materials
Sweet's Steel Co.

Tracks, Portable Rail, etc.
Central Frog & Switch Co.
Lorain Steel Co.
Sweet's Steel Co.
Weir Kilby Corp.
West Virginia Rail Co.

Track Shifters
Nordberg Mfg. Co.

Tramways, Aerial (See Aerial Tramways)

Traps, Steam
Jenkins Bros.

Treads, Non-Slip
Hendrick Mfg. Co.

Treads, Stair
Hendrick Mfg. Co.

Trolley Material, Overhead
Electric Railway Equip. Co.
Electric Service Supplies Co.
Ohio Brass Co.

Trolley Wheel Bushings
Electric Railway Equip. Co.

Trolley Wheels and Harps
Electric Railway Equip. Co.
Ohio Brass Co.

Trolley Wire
Anaconda Copper Mining Co.
Roebling's Sons Co., J. A.

Trucks, Car
American Car and Foundry Co.

Trucks, Hollow Axle
Southern Wheel Co.

Trucks and Tractors
Ford Motor Co.

Turbines, Steam
Allis-Chalmers Mfg. Co.
Barrett, Haentjens & Co.
DeLaval Steam Turbine Co.
Ridgway Dyn. & Eng. Co.

Tubining, Flexible
Du Pont de Nemours & Co., Inc., E. I.

Valve Discs
Jenkins Bros.
U. S. Rubber Co.

Valves
American Car and Foundry Co.
Jenkins Bros.
Ohio Brass Co.

Washeries, Coal
Allen & Garcia Co.
American Rheolaveur Corp.
Chance & Co., H. M.
Deister Concentrator Co.
Deister Machine Co.
Link-Belt Co.
Montgomery Coal Washing & Mfg. Co.
Pittsburgh Coal Washer Co.
Staples, H. O.
Webster Mfg. Co.

Waste
Broderick & Bascom Rope Co.

Weight Baskets (See Tipple Equipment)

Welders
Una Welding & Bonding Co.

Welders, Electric, Portable, Rail Bond
Ohio Brass Co.
Una Welding & Bonding Co.

Welders, Rail Joint
Ohio Brass Co.
Una Welding & Bonding Co.

Welding Apparatus
Ohio Brass Co.
Una Welding & Bonding Co.

Welding Electrodes
Una Welding & Bonding Co.

Wheels, Car (See Cars and Car Wheels)

Wheels, Steel
Carnegie Steel Co.
Pittsburgh Coal Washer Co.

Wire and Cable
American Steel & Wire Co.
Anaconda Copper Mining Co.
Broderick & Bascom Rope Co.
Hazard Mfg. Co.
Leschen & Sons Rope Co., A.
Paragon Electric Co.
Roebling's Sons Co., J. A.
Rome Wire Co.
Simplex Wire & Cable Co.

Wire and Cable, Insulated
American Steel & Wire Co.
Rome Wire Co.
U. S. Rubber Co.

Wire Rope (See Rope, Wire)

Wire, Trolley (See Trolley Wire)

Ryerson Steel

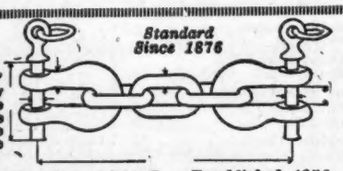
Bars, Shapes, Plates — Shafting, Tubes, Rivets — Bolts and Nuts, Boiler Fittings, Reinforcing Steel — Corrugated Sheets, Galvanized Sheets, Babbitt, etc.

Write for Journal and Stock List.

JOSEPH T. RYERSON & SON Inc. CHICAGO DETROIT ST. LOUIS BUFFALO CINCINNATI NEW YORK

"SUPERIOR" Mine Car Hitchings

Standard Since 1876



The extra strength of *"Superior"* Mine Car Hitchings assures safety and long service life. We have specialized on *"Superiors"* since 1876 and will offer you facts to prove in how many ways they are better.

Pittsburgh Knife and Forge Co., Coraopolis, Pa. *Established 1876*
Successors Pittsburgh Steel Mfg. Co. and Wm. Harris & Son Co.

ROTARY CAR-DUMPERS FOR MINE CARS

Rotary Dumpers for Railroad Cars
Car Control and Caging Equipment
Trip Control Devices
CAR-DUMPER & EQUIPMENT CO.
Skip Loading Gates
The "Solidcar" Self-Dumping Cage
The Mechanical Mine Car Sprager
Grand Crossing—CHICAGO
Westinghouse Bldg.—PITTSBURGH

ROME SUPER SERVICE

Cords and Cables
ROME WIRE CO.
BUFFALO, N. Y. ROME, N. Y.

The electrical resistance of UNA Rail Bonds is extremely low because the return current passes from rail to rail through copper and copper only.

The UNA Bond is made of copper.

It is welded to the rail with copper.

In the welding operation every strand of the bond becomes a part of the welded bond head.

The area of contact of the copper to steel weld is six times the area of the bond itself.

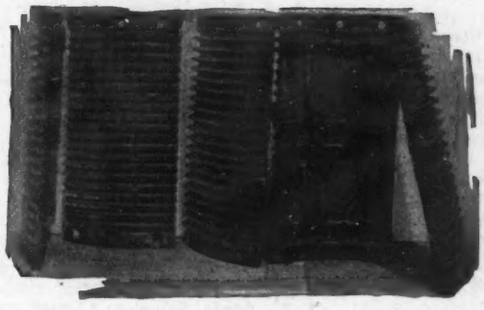
With a continuous, unbroken path of copper from rail to rail the unusually high electrical conductivity of UNA Rail Bonds is an easily understood fact.

Send for a sample of a UNA Copper to Steel weld.

UNA Welding and Bonding Co.
Cleveland, Ohio

UNA Rail Bonds, Processes, Molds and Mold Parts fully protected by U. S. Letters Patent.

"Tool Steel" Crusher Segments Outlast Manganese Steel



In Segments and in rolls for crushing coal, careful tests show that "Tool Steel" material will outlast manganese in the ratio of about 4 to 1.

Send us your inquiries and blueprints.

The Tool Steel Gear & Pinion Co.
Cincinnati, Ohio

ALPHABETICAL INDEX TO ADVERTISEMENTS

This index is published as a convenience to the reader. Every care is taken to make it accurate, but *Coal Age* assumes no responsibility for errors or omissions.

	Page
Abendroth & Root Mfg. Co.	30
Aldrich Pump Co.	31
Allen & Garcia Co.	6
Allis-Chalmers Mfg. Co.	14
American Brass Co.	30
American Car and Foundry Co.	11
American Coal Cleaning Corp.	25
American Mine Door Co.	27
American Pulverizer Co.	24
American Rheolaveur Corp.	4
American Steel & Wire Co.	36
Anaconda Copper Mining Co.	30
Atlas Car & Mfg. Co.	26
Babcock & Wilcox Co., The	25
Barrett, Haentjens & Co.	31
Bethlehem Steel Co.	12
Boyts, Porter & Co.	26
Broderick & Bascom Rope Co.	32
Cameron Steam Pump Works, A. S. (Ingersoll-Rand Co.)	7
Car-Dumper & Equip. Co.	34
Carnegie Steel Co.	31
Cement-Gun Co., Inc.	26
Central Frog & Switch Co.	25
Chance & Co., H. M.	8
Chattanooga Armature Wks.	28
Chicago Perforating Co.	26
Chicago Pneumatic Tool Co.	13
Cincinnati Electrical Tool Co.	23
Coloder Co., Inc.	24
Combustion Engineering Corp.	26
Consulting Engineers	28
Conveyor Sales Co., Inc.	22
Day-Evans Iron Works, Inc.	23
Deister Concentrator Co.	26
Deister Machine Co.	24
De Laval Steam Turbine Co.	26
Deming Co., The	31
Diamond Drilling & Exploration Co.	28
Diamond Machine Co.	22
Du Pont de Nemours & Co., Inc., E. I.	19
Earlington Machine Wks.	24
Electric Railway Equipment Co.	22
Electric Service Supplies Co.	26
Fairmont Mining Mchry. Co.	20
Fate-Root-Heath Co.	30
Fawcus Machine Co.	26
Flory Mfg. Co., S.	26
Ford Motor Co.	21
For Sale Ads	29 & 30
Ganschow Co., Wm.	26
Goulds Mfg. Co.	31
Harrington & King Perforating Co.	27
Hazard Mfg. Co.	32
Hendrick Mfg. Co.	22
Holmes & Bros., Inc., Robt.	25
Howells Mining Drill Co.	24
Hulburt Oil & Grease Co.	9
Hyatt Roller Bearing Co.	Inside Front Cover
Ingersoll-Rand Co. (Cameron Steam Pump Works, A. S.)	7
Interstate Equipment Corp.	30
Irwin Foundry & Mine Car Co.	31
Jeffrey Mfg. Co., The	3
Jenkins Bros.	23
Joy Manufacturing Co.	24
Leschen & Sons Rope Co., A.	32
Lima Locomotive Wks., Inc.	18
Linde Air Products Co.	15
Link-Belt Co.	Outside Back Cover
Lipe, Inc., W. C.	23
Little Giant Co.	28
Lorain Steel Co.	27
Marine Canvas Supply Corp.	28
Marion Machine Foundry & Supply Co.	20
Marion Steam Shovel Co.	24
Medart Co., The	28
Michigan Pipe Co., The	30
Midland Steel Products Co.	18
Montgomery Coal Washing & Manufacturing Co.	24
Morrow Mfg. Co.	24
Morse Chain Co.	26
Nordberg Mfg. Co.	26
Ohio Brass Co., The	2
Okonite-Callender Cable Co., Inc.	28
Okonite Co., The	28
Ottumwa Iron Works	26
Paragon Electric Co.	36
Pennsylvania Crusher Co.	24
Pittsburgh Coal Washer Co.	22
Pittsburgh Knife & Forge Co.	34
Positions Vacant	29
Positions Wanted	29
Porter Co., H. K.	10
Power Equipment Co.	31
Punxsutawney Drilling and Contracting Co.	28
Raymond Bros. Impact Pulverizer Co.	24
Reading Iron Co.	Inside Back Cover
Ridgway Dynamo & Engine Co.	26
Roberts & Schaefer Co.	22
Roebling's Sons Co., J. A.	32
Rome Wire Co.	34
Ryerson & Sons, Inc., J. T.	34
Sanford-Day Iron Works	31
Schools and Colleges	28
Searchlight Section	29 & 30
Second-Hand Equipment	29 & 30
Simplex Wire & Cable Co.	24
Southern Coupon Co.	32
Southern Wheel Co.	27
Standard Wood Pipe Co.	30
Staples, H. O.	8
Sullivan Machinery Co.	28
Sweet's Steel Co.	30
Testing Engineers	28
Testing Laboratories	28
Thomas Elevator Co.	27
Timken Roller Bearing Co.	Front Cover
Tool Steel Gear & Pinion Co.	35
Una Welding & Bonding Co.	35
U. S. Rubber Co.	32
Vulcan Iron Works	5
Want Advertisements	29
Watt Mining Car Wheel Co.	20
Waverly Oil Works Co.	16
Webster Mfg. Co., The	24
Weir Kilby Corp.	17
West Virginia Rail Co., The	32
Whitcomb Co., Geo. D.	26
Wilmot Engineering Co.	22
Wyckoff & Son Co., A.	30

INDEX TO SEARCHLIGHT SECTION

	Page
Archer Armstrong, Inc.	29
Cohen & Sons, Louis	30
Duquesne Elec. & Mfg. Co.	29
Frank, M. K.	30
Fuerst-Friedman Co.	29
Green Railway Equip. Co., L. A.	30
Hyman-Michaels Co.	30
Miller-Owen Electric Co.	29
Moorhead Elec. Mchry. Co.	29
Morrison & Risman Co., Inc.	30
Nashville Indust. Corp.	30
Positions Vacant	29
Positions Wanted	29
Want Ads	29

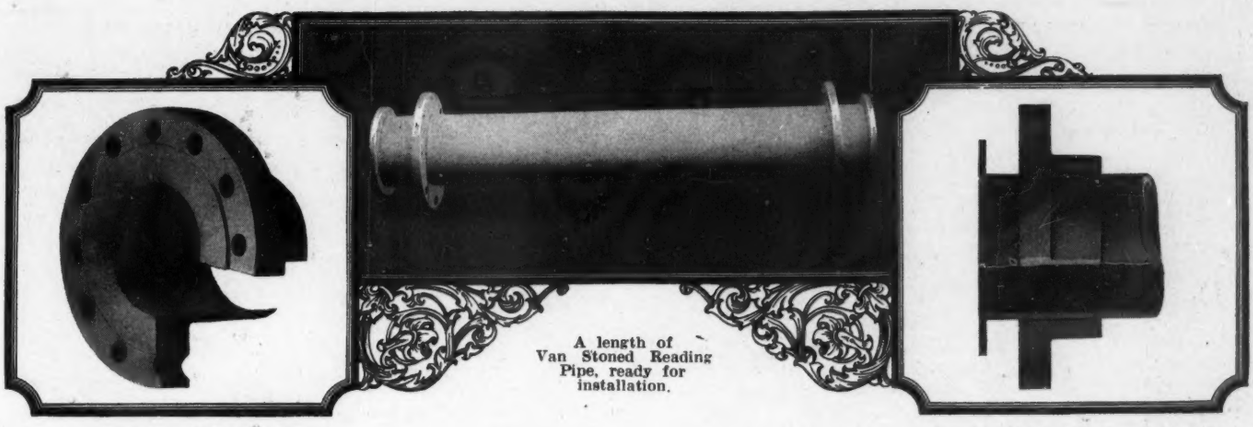
Use Ironite

Rubber Insulated Telephone Wire

For Your Telephone Lines **IN YOUR MINES**

It has greatest possible tensile strength, toughness of insulation and flexibility and high conductivity—all the essentials for best service and durability. More serviceable than hard drawn copper and a lot cheaper. *Write for free sample.*

Paragon Electric Co. **35 W. Van Buren St., Chicago**



A length of Van Stoned Reading Pipe, ready for installation.

Reinforced Van Stone Joint Showing Square Corner

Reinforced Square Corner Van Stone Joint showing Loose Flange.

An Accomplishment of Interest to the Engineering Profession

Ever since the Van Stone joint was perfected, it has been the desire of the engineering profession to successfully Van Stone genuine wrought iron pipe. Owing to the structure of this metal, however, the very quality (the siliceous slag content) which protects genuine wrought iron from corrosion was that which prevented the formation of the square-edged, strong flange required for a perfect Van Stone joint.

During the past two years, however, a new method of fabricating this joint has been perfected and a number of jobs with Van Stoned Reading Pipe have been installed with the greatest success.

It is no longer necessary to use less enduring pipe in power plants. Reading Genuine Wrought Iron Pipe can be used throughout, including all sizes that are to be Van Stoned.

READING IRON COMPANY

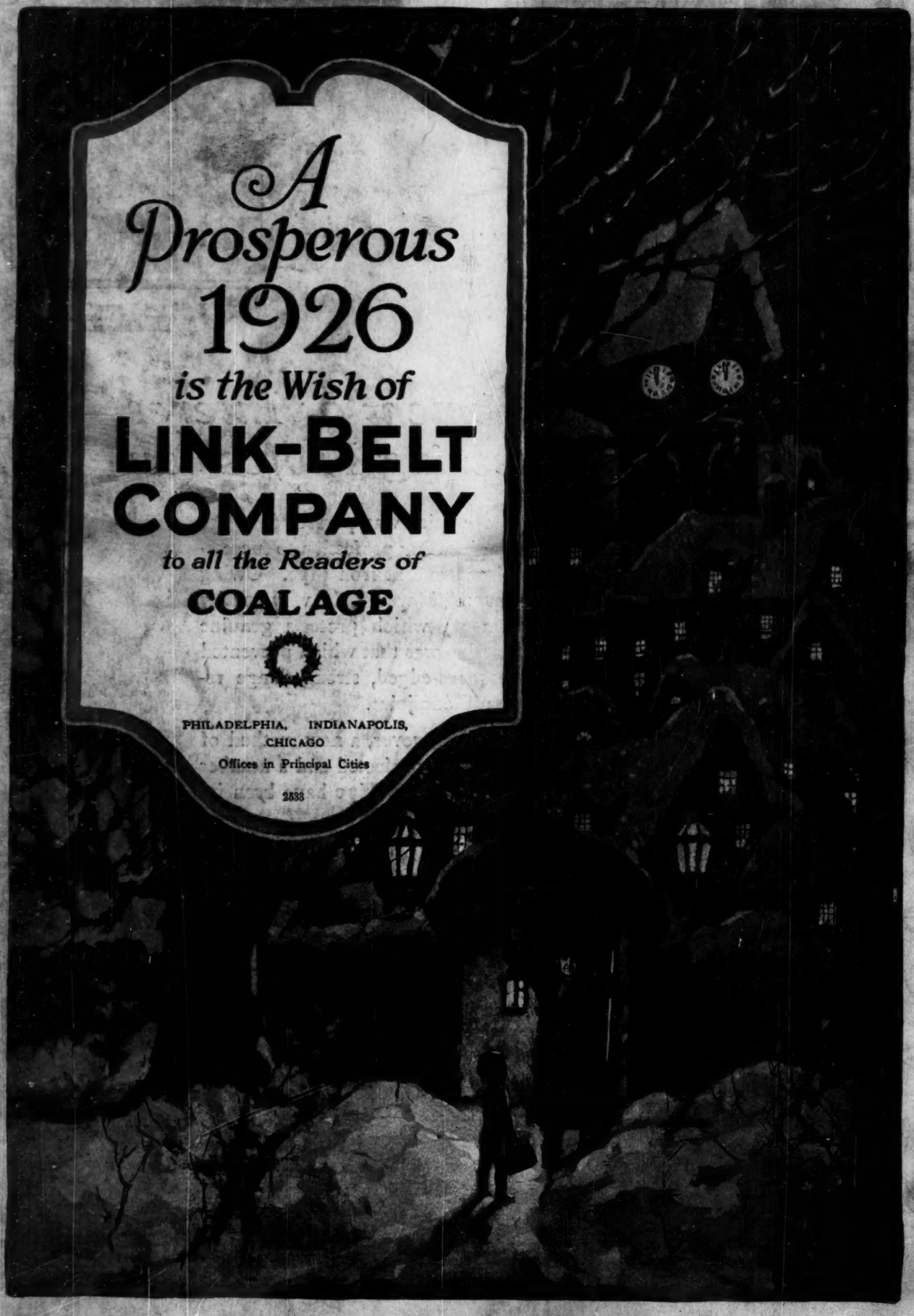
Established READING, PA. 1848

World's Largest Makers of Genuine Wrought Iron Pipe

Boston	Pittsburgh	Baltimore
Philadelphia	Chicago	Cincinnati
Seattle	New York	Los Angeles
Dallas	San Francisco	St. Louis

READING PIPE

GENUINE WROUGHT IRON


A
Prosperous
1926
is the Wish of
LINK-BELT
COMPANY
to all the Readers of
COAL AGE
PHILADELPHIA, INDIANAPOLIS,
CHICAGO
Offices in Principal Cities
2533